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NASA SP-7011 (100)



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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

(Supplement 100)

MARCH 1972

NASA SP-7011 (100)

Aerospace Medicine and Biology

Pages 49-93

MARCH 1972

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ACCESSION NUMBER RANGES

Accession numbers cited in this Supplement fall within the following ranges:

STAR (N-10000 Series) N72-11852—N72-13975

IAA (A-10000 Series) A72-12901—A72-15750

This bibliography was prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by Informatics Tisco, Inc.

Use of funds for printing this publication approved by the Director of the Office of Management and Budget June 23, 1971.

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 100)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in February 1972 in

- *Scientific and technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA)*



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Supplement 12A

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INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 317 reports, articles, and other documents announced during February 1972 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, irregular supplements have been issued.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations and abstracts are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Two indexes—subject and personal author—are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1972 Supplements.

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IAA ENTRIES (A72-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc., (AIAA), as follows: Paper copies are available at \$5.00 per document up to a maximum of 20 pages. The charge for each additional page is 25 cents. Microfiche ⁽¹⁾ are available at the rate of \$1.00 per microfiche for documents identified by the # symbol following the accession number. A number of publications, because of their special characteristics, are available only for reference in the AIAA Technical Information Service Library. Minimum airmail postage to foreign countries is \$1.00. Please refer to the accession number, e.g., A72-10613, when requesting publications.

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GENERAL AVAILABILITY

All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

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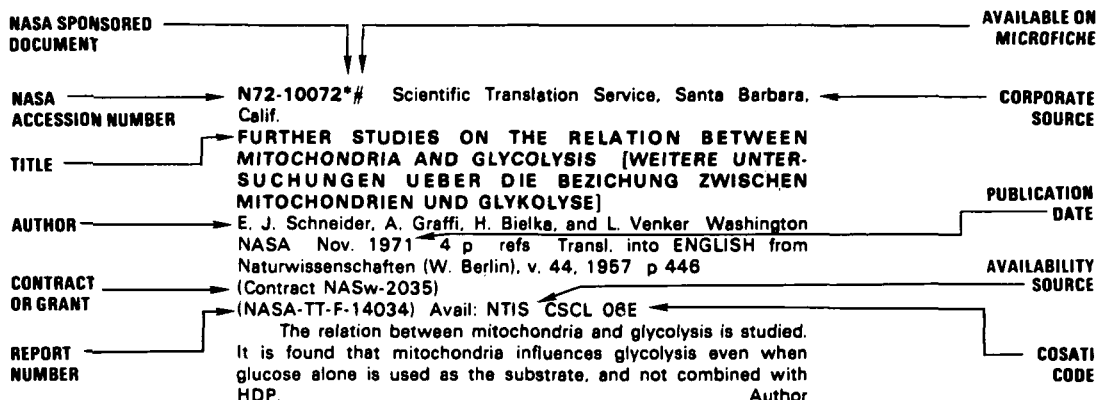
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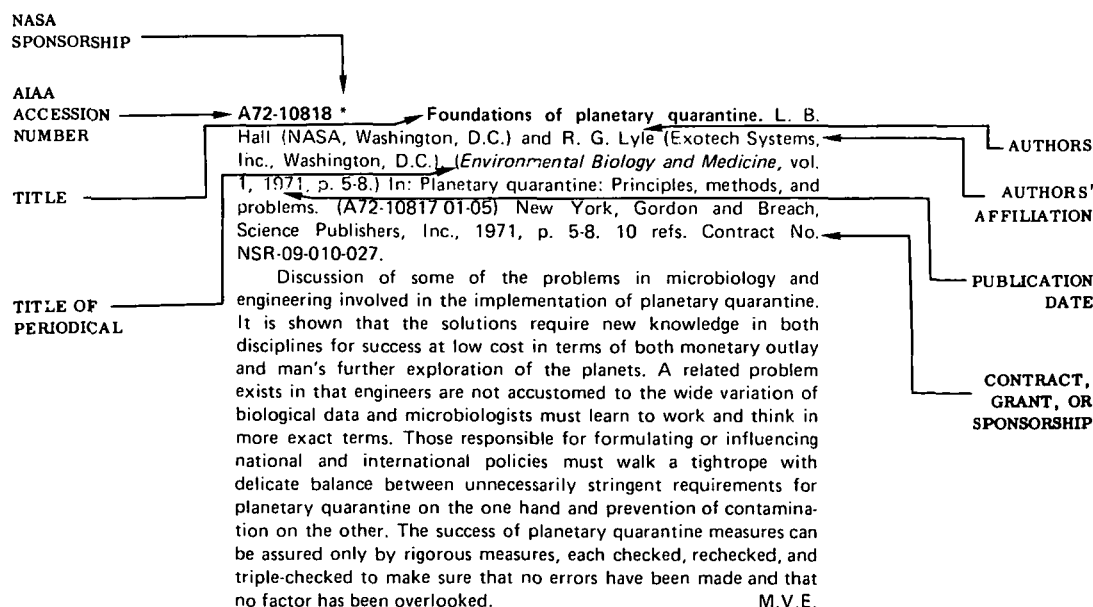
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TYPICAL CITATION AND ABSTRACT FROM IAA





AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 100)

MARCH 1972

IAA ENTRIES

A72-12911 # Some aspects of the interaction of primary cosmic rays with tissues. A. Pasinetti (Milano, Università, Milan, Italy). *Sciences et Industries Spatiales*, vol. 7, Nov. 1971, p. 6-16. 26 refs.

Examination of some of the most important aspects of the biological effects of heavy primary cosmic nuclei. The composition of primary cosmic rays and the types of interaction with the elements composing tissues is described. Attention is given to the biological effects of the 'enders,' and the nuclear reactions inducing radioactivity in an astronaut's body. Data from current experiments concerning the nuclear fragmentation of light elements are given, as well as some characteristics of the highly ionizing particles emitted during high-energy proton interactions. F.R.L.

A72-12951 Numerical analysis of pressure and flow pulsations in a segment of the arterial tree. H.-G. Karlsson (Lund Institute of Technology, Lund, Sweden), B. Jonson, and R. Nilsén (Lund, Universitet, Lund, Sweden). *Medical and Biological Engineering*, vol. 9, Sept. 1971, p. 431-445. 28 refs. Research supported by the Swedish National Science Research Council.

The arterial blood pressure and the rate of volume pulsations were measured experimentally as functions of time for a segment of the human arm. Using these curves and a type of identification program, common in control engineering, a mathematical model was calculated for the arterial tree included in the segment. This mathematical model led to the construction of an electrical analogue circuit for simulating the time-dependence of the rate of volume pulsations on the arterial pressure. In both cases the results show a close agreement between the simulated curves and the physiological curves determined experimentally. The inertia of blood and vessels is shown to be negligible, while nonlinear compliances must be included when dealing with wide pressure ranges. (Author)

A72-12952 An experimental stress analysis of the neck of the femur. J. F. Williams (Melbourne, University, Melbourne, Australia) and N. L. Svensson (New South Wales, University, Sydney,

Australia). *Medical and Biological Engineering*, vol. 9, Sept. 1971, p. 479-493. 17 refs.

The paper is concerned with the experimental analysis of the distribution of stress across the neck of the femur (thigh bone). The case considered was that of a man supported on one leg, a position which imposes maximum static load on the femur. The frozen stress method of three dimensional photoelasticity was adopted as the means of solution. A procedure was devised for correcting the results obtained from a homogeneous photoelastic model to apply to the case of bone which was considered to be composed of two main regions, a hard shell and a softer core. The bending and axial stress components so determined show a distribution which can be predicted by an engineering analysis but the shear stress distribution is not so satisfactory. Furthermore, additional weight has been added to the theory that bone growth occurs in response to applied stress. (Author)

A72-12953 The impedance of stainless-steel electrodes. L. A. Geddes, C. P. Da Costa (Baylor University, Houston, Tex.), and G. Wise (Rice University, Houston, Tex.). *Medical and Biological Engineering*, vol. 9, Sept. 1971, p. 511-521. 22 refs. NIH Grant No. 2-T1-HE-5125,15; PHS Grant No. 1-ROI-FD00044-01.

The resistive and capacitive properties of stainless-steel electrodes in contact with saline solutions of various concentrations were investigated over a frequency range extending from 20 to 10 kHz by using a variable-length conductivity cell. With a low current density, the series-equivalent resistance and capacitance of a single electrode-electrolyte interface were found to vary almost inversely as the square root of frequency. In the frequency range studied, it was found that the reactance was very nearly equal to the resistance and both varied almost inversely as the square root of the frequency, verifying Warburg's postulate. When current density was increased, resistance decreased and capacitance increased at all frequencies studied; the change in each was most apparent in the low frequency region. As a consequence, it can be stated that the impedance of an electrode-electrolyte interface decreases with increasing current density. (Author)

A72-12975 * Studies of the effect of gibberellic acid on algal growth. W. K. Evans and C. Sorokin (Maryland, University, College Park, Md.). *Life Sciences, Part II - Biochemistry, General and Molecular Biology*, vol. 10, Nov. 8, 1971, p. 1227-1235. 16 refs. NASA-supported research.

The effect of gibberellic acid on exponential growth rate of four strains of *Chlorella* was investigated under variety of experimental conditions. In concentrations from 10 ppm to 100 ppm, gibberellic acid was shown to have no effect on *Chlorella* growth. In concentration of 200 ppm, gibberellic acid exerted some unfavorable effect on algal growth. (Author)

A72-13023 Human factors: Theory and practice. D. Meister (Bunker-Ramo Corp., Los Angeles, Calif.). New York, Wiley-Interscience, 1971. 418 p. 179 refs. \$16.95.

The book, intended to be both theoretical and practical, attempts to describe what the human factors specialist actually does during system development, what he should be doing, and what the factors underlying and impacting on his discipline are. Following an exploration of the various ways in which human factors can be defined, the significance of the error concept to human factors theory and practice is pointed out. A step-by-step description is given of how the human factors specialist analyzes system requirements and identifies the interface equipment needed to implement man-machine interaction. The human factors research required to supply the data for the analyses is outlined. Attention is given to human factors in predesign and detail design, the role of the engineer, the procurement of human factors research, H group organization, and the status of H theory, practice, and research. F.R.L.

A72-13068 Medical primatology 1970; Proceedings of the Second Conference on Experimental Medicine and Surgery in Primates, New York, N.Y., September 7-12, 1969. Edited by E. I. Goldsmith (Cornell University, New York, N.Y.) and J. Moor-Jankowski (New York University, New York, N.Y.). Basel, S. Karger AG, 1971. 1008 p. \$67.20.

The immunological response in man and nonhuman primates is treated, together with topics involving experimental transplantation in primate animals, comparative biology, genetics and phylogenetics, the nervous system of man and nonhuman primates, perinatal biology and development, behavioral physiology, virology, infectious diseases, and reports from major primate laboratories and current programs.

M.M.

A72-13069 Visual similarities of nonhuman and human primates. F. A. Young (Washington State University, Pullman, Wash.) and D. N. Farrer (USAF, Aeromedical Research Laboratory, Holloman AFB, N. Mex.). In: Medical primatology 1970; Proceedings of the Second Conference on Experimental Medicine and Surgery in Primates, New York, N.Y., September 7-12, 1969.

Basel, S. Karger AG, 1971, p. 316-328. 49 refs.

Comparison of the anatomical-physiological, optical and behavioral-visual characteristics of nonhuman and human primates. It is pointed out that all the characteristics found in the human eye are found in the primate animals from the macaques upward, even to the presence of Bowman's membrane, which is found only in primates.

M.M.

A72-13070 Endocrine thermoregulatory activity of the hypothalamus. C. C. Gale (Washington, University, Seattle, Wash.). In: Medical primatology 1970; Proceedings of the Second Conference on Experimental Medicine and Surgery in Primates, New York, N.Y., September 7-12, 1969. Basel, S. Karger AG, 1971, p. 341-353. 21 refs. NIH Grants No. FR-00166; No. NB-06622.

Study of the thermoregulatory activity of neuroendocrine, cardiovascular, and neuromuscular systems, and investigation of behavioral thermoregulatory response to central cooling and warming. The results obtained underscore the thermosensitivity of the POAH preoptic/anterior hypothalamic region and suggest that stimulation of central thermoreceptors by potentially harmful levels of warmth causes suppression of the thermogenic drive from cutaneous cold receptors. Such predominance of hypothalamic warmth receptors may play a crucial role in emergency situations, such as heat exhaustion, by limiting muscular activity and reducing metabolic rate. Similarly, the importance of anesthetic depression of

the central thermoregulatory apparatus prior to general hypothermia for surgery is obvious because extreme cold stress mobilizes thermogenic mechanisms maximally and leads rapidly to exhaustion.

M.M.

A72-13071 Alteration of sleep and circadian rhythms by the use of drugs. G. V. Pegram, R. J. Bradley, and J. M. Rhodes (USAF, Aeromedical Research Laboratory, Holloman AFB, New Mexico, University, Albuquerque, N. Mex.). In: Medical primatology 1970; Proceedings of the Second Conference on Experimental Medicine and Surgery in Primates, New York, N.Y., September 7-12, 1969. Basel, S. Karger AG, 1971, p. 455-461. 6 refs. Contract No. F29600-68-C-0006.

Study of the interaction between the two independent desynchronizers of normal endogenous rhythms in monkeys represented by time zone shift and p-chlorophenylalanine (PCPA). The primary objective of the study was to determine if 5-HT depletion (PCPA administration) could enhance physiological and behavioral adjustment to a 6-hr phase shift. The results presented are of a preliminary nature and form part of a larger study investigating the interaction of environmental parameters, work/rest cycles and sleep patterns. M.M.

A72-13072 Behavioral temperature regulation in the squirrel monkey - Some limits of hypothalamic control. E. R. Adair (John B. Pierce Foundation; Yale University, New Haven, Conn.). In: Medical primatology 1970; Proceedings of the Second Conference on Experimental Medicine and Surgery in Primates, New York, N.Y., September 7-12, 1969. Basel, S. Karger AG, 1971, p. 462-470. 5 refs. PHS Grant No. ES-00354-01.

Description of experiments furnishing evidence for the existence of more than one thermoregulatory site which provides signals for the behavioral regulation of body temperature. One of these sites is located in the hypothalamus, and at least one other is located elsewhere in the body. The experiments also demonstrate that when the hypothalamic temperature is artificially manipulated, signals from the other site (or sites) may affect the behavioral response or not, depending upon the duration and level of the manipulation of the hypothalamic temperature. M.M.

A72-13073 Primates in eye movement research. A. M. Schrier, M. L. Povar, and J. Vaughan (Brown University, Providence, R.I.). In: Medical primatology 1970; Proceedings of the Second Conference on Experimental Medicine and Surgery in Primates, New York, N.Y., September 7-12, 1969. Basel, S. Karger AG, 1971, p. 847-858. 15 refs. NSF Grant No. GB-7590; PHS Grant No. MH-15389.

Description of a technique for measuring eye orientation in monkeys. Some of the results obtained during performance of brightness discrimination tasks are presented. The apparatus is a modification of Mackworth's head-mounted eye-marker's apparatus for humans (Mackworth and Thomas, 1962). The basic components of Mackworth's system are mounted on a helmet, so that the subject's head is free to move. These components are: (1) a camera objective lens (the scene lens), which forms an image of the visual field; (2) a light source, which produces a corneal reflection; and (3) a second lens (the eye lens), which is focused on the corneal reflection. A method of on-line computer recording and analysis of the location of the eye spot has been developed. M.M.

A72-13141 Ballistocardiography and clinical studies; Ballistocardiograph Research Society, Annual Meeting, 14th, Atlantic City, N.J., May 2, 1970, Proceedings. Edited by W. K. Harrison (Johns Hopkins University, Baltimore, Md.). Basel, S. Karger AG

(Bibliotheca Cardiologica, No. 27), 1971. 89 p. \$6.60.

Research reports dealing with ballistocardiographic studies in human cardiac transplantation, the effect of carotid sinus nerve stimulation on the heart for a patient with angina pectoris, the effect of bundle branch block on cardiac dynamics as recorded with the hf (acceleration) direct body ballistocardiograph, measurements of cranial blood flow, and a simplified technique for obtaining the hf ballistocardiogram in the erect position. The equipment and techniques used and the results obtained are described.

M.M.

A72-13142 **Ballistocardiographic and angiographic correlative study in idiopathic hypertrophic subaortic stenosis.** D. H. Jackson, E. E. Eddleman, Jr., W. H. Bancroft, Jr., and R. H. Swatzell, Jr. (U.S. Veterans Administration Hospital; Alabama, University, Birmingham, Ala.). In: Ballistocardiography and clinical studies; Ballistocardiograph Research Society, Annual Meeting, 14th, Atlantic City, N.J., May 2, 1970, Proceedings. Basel, S. Karger AG, 1971, p. 14-20. 13 refs. PHS Grants No. HE-11310; No. HE-05737.

Demonstration that relating BCG (ballistocardiogram) variables to dynamic variables may be useful in considering abnormality of ventricular function. It is suggested that it may be an important value inherent in ballistocardiography. It is pointed out that, although many of the (BCG) abnormalities noted in the study are difficult to explain, the changes do appear to indicate a greater contractile force in idiopathic subaortic hypertrophic stenosis and a more rapid acceleration of early ventricular emptying.

M.M.

A72-13143 **The effect of bundle branch block on cardiac dynamics as recorded with the high frequency /acceleration/ direct body ballistocardiograph.** N. J. Winer (Lenox Hill Hospital, New York, N.Y.). In: Ballistocardiography and clinical studies; Ballistocardiograph Research Society, Annual Meeting, 14th, Atlantic City, N.J., May 2, 1970, Proceedings. Basel, S. Karger AG, 1971, p. 25-35. 5 refs. Research supported by the Florence G. Heller Foundation.

Demonstration that bundle branch block in regular sinus rhythm may have a definitive effect on the nature of the cardiac dynamic response. It is pointed out that left bundle branch block has a notable effect on BCG (ballistocardiogram) dynamics as characterized by: (1) prolongation of the systolic interval, primarily, due to prolongation of the isometric period; and (2) diminution of early systolic forces as correspondingly reflected in the BCG, CP2 and PCG (phonocardiogram).

M.M.

A72-13144 **Etiological factors associated with the diminution of ballistocardiographic amplitudes occurring with advancing age.** R. Proper and F. Wall (Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.). In: Ballistocardiography and clinical studies; Ballistocardiograph Research Society, Annual Meeting, 14th, Atlantic City, N.J., May 2, 1970, Proceedings. Basel, S. Karger AG, 1971, p. 40-43. 10 refs. NIH Grant No. 5-R01-HD-00518.

Ballistocardiograms were examined to determine the age-related variances in electrical and ballistic amplitudes that could be attributed to anthropometric increases in chest circumference, abdominal circumference and percent body fat noted in older subjects. The results indicate that the effects of increasing body fat and circumferences of the chest and abdomen are relatively insignificant and the relationship between these anthropometric parameters and age is essentially the same. It is concluded that age-related diminutions in ballistocardiographic and electrocardiographic amplitudes appear to be related primarily to diminishing heart size, and to some lateralization in the position of the heart.

M.M.

A72-13145 **Measurements of cranial blood flow using ballistocardiography.** W. K. Harrison (Johns Hopkins University, Baltimore, Md.). In: Ballistocardiography and clinical studies; Ballistocardiograph Research Society, Annual Meeting, 14th, Atlantic City, N.J., May 2, 1970, Proceedings. Basel, S. Karger AG, 1971, p. 53-58.

A quantitative, noninvasive method (ballistoencephalography) for measuring human cerebral circulation is described. A simple formula is derived for calculating the net cranial blood inflow during cardiac ejection. Calculations of net cranial inflow in 8 normal subjects are presented and compared with estimates of this quantity based on general physiological knowledge. Ballistoencephalography is potentially valuable for diagnosis of cerebral circulatory deficit if its precise physiological basis can be fully elucidated.

M.M.

A72-13146 **A simplified technique for obtaining the high frequency ballistocardiogram in the erect position.** E. W. Bixby, Jr. In: Ballistocardiography and clinical studies; Ballistocardiograph Research Society, Annual Meeting, 14th, Atlantic City, N.J., May 2, 1970, Proceedings. Basel, S. Karger AG, 1971, p. 79-82.

Brief description of preliminary results achieved in the search of a simple method for obtaining an erect ballistocardiogram (BCG) that could be incorporated into the erect chest X-ray film taken for the public on routine health surveys in a fixed or mobile situation. It is pointed out that experience using the Starr hf table in the near-vertical position, with the addition of special techniques for fixation, damping, counterbalancing and calibration, has given remarkably good tracings in preliminary testing.

M.M.

A72-13161 **Systems, Man and Cybernetics Group, Annual Symposium, Anaheim, Calif., October 25-27, 1971, Record.** Symposium sponsored by the Institute of Electrical and Electronics Engineers. New York, Institute of Electrical and Electronics Engineers, Inc., 1971. 356 p. Members, \$10.00; nonmembers, \$15.

Papers in civil, social, urban, and health-care systems are devoted to interdisciplinary advances in these major system areas. Topics include digital simulation, systems analysis, pattern classification, decision-directed learning, information systems and displays, systems applications of availability analysis, and the system scientist in the changing job market. Computer algorithms and numerical models of specific systems are outlined.

M.M.

A72-13162 **Modeling man-machine control systems in biodynamic environments.** H. R. Jex (Systems Technology, Inc., Hawthorne, Calif.). In: Systems, Man and Cybernetics Group, Annual Symposium, Anaheim, Calif., October 25-27, 1971, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1971, p. 91-96. 21 refs.

Review of the current status of developments in modeling man-machine control behavior in biodynamic environments. The models which are appropriate for manual control performance are reviewed, together with the added elements necessary to deal with biodynamic interfaces. Some simplified relationships relating the parameters of the models to the man-machine control performance are surveyed, together with some biodynamic interface pilot/vehicle problems which have occurred, have been solved, or need to be solved.

M.M.

A72-13163 * **A dynamic model of the human postural control system.** J. C. Hill (Oakland University, Rochester, Mich.). In: Systems, Man and Cybernetics Group, Annual Symposium, Anaheim, Calif., October 25-27, 1971, Record. New York,

Institute of Electrical and Electronics Engineers, Inc., 1971, p. 104-109. Grant No. NGR-23-054-033.

Description of a digital simulation of the pitch axis dynamics of a stick man. The difficulties encountered in linearizing the equations of motion are discussed; the conclusion reached is that a completely linear simulation is of such restricted validity that only a nonlinear simulation is of any practical use. Typical simulation results obtained from the full nonlinear model are illustrated. M.M.

A72-13176 **Coronary heart disease; Proceedings of the International Symposium, Frankfurt am Main, West Germany, January 22-24, 1970.** Edited by M. Kaltenbach (Universitäts-Kliniken, Frankfurt am Main, West Germany) and P. Lichtlen (Kantonsspital, Zurich, Switzerland). Stuttgart, Georg Thieme Verlag, 1971. 279 p. \$11.30.

This volume contains the proceedings of a European symposium on selective coronary and left ventricular angiography. Problems of technique, anatomy, and nomenclature are discussed together with details regarding the impaired myocardial functions in coronary disease, questions arising from exercise electrocardiography, and different means of assessing coronary blood flow in man. Concerning medical treatment of coronary heart disease, special attention is given to the concept of Beta-blockade. In surgical therapy, the discussion is focused on revascularization by mammary artery implantation and especially by aorto-coronary venous bypass.

G.R.

A72-13177 **History and clinical findings related to selective coronary angiography.** H.-J. Becker, M. Kaltenbach, G. Kober, J. Kollath, P. Spitz (Universitäts-Kliniken, Frankfurt am Main, West Germany), P. Lichtlen, P. C. Baumann, B. Preter (Kantonsspital, Zurich, Switzerland), and H. Albert (Spital Limmattal, Zurich, Switzerland). In: *Coronary heart disease; Proceedings of the International Symposium, Frankfurt am Main, West Germany, January 22-24, 1970.* Stuttgart, Georg Thieme Verlag, 1971, p. 56-60.

All patients were examined in the same way. They received either 10 mg Valium or no medication. The injection of contrast medium was repeated in different positions. A film of the coronary arteries was usually made in left and right anterior oblique position. Pathological findings were divided into four groups including minimal obstructions, partial obstructions, subtotal stenosis, and total obstruction. Risk factors, relations between angina pectoris and angiogram, and the correlation between myocardial infarction in the history and the angiogram are discussed. G.R.

A72-13178 **Exercise electrocardiogram and selective coronary arteriography.** M. Kaltenbach, H.-J. Becker, J. Kollath, E. Spitz, and G. Kober (Universitäts-Kliniken, Frankfurt am Main, West Germany). In: *Coronary heart disease; Proceedings of the International Symposium, Frankfurt am Main, West Germany, January 22-24, 1970.* Stuttgart, Georg Thieme Verlag, 1971, p. 66-78. 14 refs.

In 51 patients with selective cinecoronary arteriography and ventriculography, the morphological patterns were compared with the exercise ECG. From 33 patients with abnormal exercise tests, 28 revealed severe stenosis or occlusion of one or more large branches of coronary arteries. Five patients had normal coronary arteries or only little changes. From 18 patients with normal exercise tests, 16 had no pathological patterns or insignificant stenosis. The two patients with normal exercise tests had a remote anterior myocardial infarct, and did show significant stenosis in the anterior interventricular branch of left coronary artery but no severe stenosis or occlusion in other branches of the coronary arteries. G.R.

A72-13179 **Technique and clinical value of coronary flow measurement in man.** G. C. Friesinger (Johns Hopkins Hospital, Baltimore, Md.). In: *Coronary heart disease; Proceedings of the International Symposium, Frankfurt am Main, West Germany, January 22-24, 1970.* Stuttgart, Georg Thieme Verlag, 1971, p. 90-100. 24 refs.

The measurement of myocardial blood flow as an adjunct in the assessment of ischemic heart disease is discussed. The major techniques and their modifications for this type of measurement are listed. Since ischemic heart disease is often regional in its distribution, the inability of these techniques to detect regional ischemia is a severe disadvantage. It is possible that imaging devices may help provide a solution to this problem, but only work of a very preliminary nature has been done in this field to date. A method involving the injection of xenon-133 directly into the coronary arteries is discussed. The radioactivity is detected in this case with the aid of precordial scintillation during the washout of the radioactivity. Other approaches involve the use of dinitrogen oxide. G.R.

A72-13180 **Application of the xenon-133 method in exercise.** S. Holmberg (Medizinische Klinik I, Göteborg, Sweden). In: *Coronary heart disease; Proceedings of the International Symposium, Frankfurt am Main, West Germany, January 22-24, 1970.* Stuttgart, Georg Thieme Verlag, 1971, p. 101-106.

Coronary blood flow is measured by the clearance method using xenon-133. The indicator is injected in aorta ascendens or in the left atrium. The coronary sinus blood is continuously withdrawn from a catheter in coronary sinus through a glass spiral placed in a well-shaped scintillation detector. This method of coronary flow could be used for repeated measurements of coronary blood flow both at rest and during work. It seems suitable for coronary flow measurements in coronary healthy patients but it gives only a value of the dominating coronary flow. For this reason it has a limited value in patients with coronary disease. G.R.

A72-13181 **Appraisal of the xenon clearance method for recording myocardial blood flow - Determinations under different hemodynamic conditions.** P. Lichtlen (Kantonsspital, Zurich, Switzerland), H. Albert (Spital Limmattal, Zurich, Switzerland), and T. Moccetti (Universitäts-Klinik, Zurich, Switzerland). In: *Coronary heart disease; Proceedings of the International Symposium, Frankfurt am Main, West Germany, January 22-24, 1970.* Stuttgart, Georg Thieme Verlag, 1971, p. 106-120. 14 refs.

The accuracy and reliability of the xenon clearance method in determining high and low left coronary artery (LCA) blood flow were assessed under different pharmacologically induced hemodynamic conditions. LCA flow was increased by administration of either Angiotensin or Isoproterenol. A decrease of LCA flow was obtained via beta-blockade. In all cases the myocardial clearance of selectively injected xenon-133 was determined by the precordial disappearance of radioactivity. G.R.

A72-13182 **Regional myocardial blood flow evaluated with xenon-133.** G. Kober and M. Kaltenbach (Universitäts-Kliniken, Frankfurt am Main, West Germany). In: *Coronary heart disease; Proceedings of the International Symposium, Frankfurt am Main, West Germany, January 22-24, 1970.* Stuttgart, Georg Thieme Verlag, 1971, p. 120-129. 18 refs.

Discussion of blood flow measurements by the Xe-133 clearance method after direct application of the isotope into the subendocardial and subepicardial layers of the left ventricle. In seven normotensive dogs the blood supply to the inner layer of the

ventricular wall was found to be smaller by 8.7% than the blood supply to the outer parts. In eight chronic hypertensive animals this difference in favor of the outer layer was as high as 27%. The significance of these findings is discussed. G.R.

A72-13183 **Measurement of coronary blood flow in various hemodynamic conditions using the argon technique.** K. Kochsiek, J. Neubaur, D. Larbig (Medizinische Universitäts-Klinik, Göttingen, West Germany), L. A. Cott, and M. Tauchert (Göttingen, Universität, Göttingen, West Germany). In: *Coronary heart disease; Proceedings of the International Symposium, Frankfurt am Main, West Germany, January 22-24, 1970.* Stuttgart, Georg Thieme Verlag, 1971, p. 137-153. 28 refs.

Coronary blood flow, oxygen consumption, and coronary vascular resistance were determined at rest and after maximum coronary dilation by intravenous administration of dipyridamole in 14 patients with aortic stenosis (AS), nine patients with aortic insufficiency (AI), and nine patients with mitral valvular disease (MV). The coronary vascular resistance was calculated. The coronary blood flow was determined by means of the argon inert gas method. G.R.

A72-13234 **Radiation exposure on high-altitude passenger flights.** H. J. Schaefer (U.S. Naval Aerospace Medical Center, Aerospace Medical Institute, Pensacola, Fla.). In: *Advances in biological and medical physics.* Volume 13. Edited by J. H. Lawrence, J. W. Gofman, and T. L. Hayes. New York, Academic Press, Inc., 1970, p. 153-206. 66 refs.

In the altitude region beyond 60,000 ft two basically different types of radiation exposure have to be examined including the normal radiation level due to galactic radiation and short-term increases of the normal level due to solar particle beams. It is emphasized, however, that flares which would create greatly elevated radiation levels as far down in the air ocean as 60,000 ft are rare events. Instantaneous radiation levels at different altitudes and latitudes are analyzed together with accumulated radiation exposures to crew members and passengers as well as the resulting radiation burden to the entire population. G.R.

A72-13621 **Conduction velocity groups in the cat's optic nerve classified according to their retinal origin.** J. Stone and R. B. Freeman, Jr. (Max-Planck-Institut für Psychiatrie, Munich, West Germany). *Experimental Brain Research*, vol. 13, no. 5, 1971, p. 489-497. 25 refs.

By recording antidromic field potentials and unit responses generated in the retina by stimulation of the optic tract and optic disk, evidence was obtained which suggests that velocity is related to the retinal origin of the axons. It is shown that it may be meaningful to distinguish four conduction velocity groups, two arising from peripheral retina, and two from the area centralis. O.H.

A72-13622 **Optic nerve axon diameters measured in the cat retina - Some functional considerations.** J. Stone and H. Holländer (Max-Planck-Institut für Psychiatrie, Munich, West Germany). *Experimental Brain Research*, vol. 13, no. 5, 1971, p. 498-503. 6 refs.

An anatomical basis is presented for the classification of conduction velocity groups of the cat's optic nerve as suggested by Stone and Freeman (1971) - i.e., a classification distinguishing four groups, two arising from peripheral retina, and two from the area centralis. It is demonstrated that axons arising from the area centralis are, on the average, markedly smaller than axons arising peripherally. O.H.

A72-13623 **Lateral geniculate unit activity and eye movements - Saccade-locked changes in dark and in light.** M. Jeannerod and P. T. S. Putkonen (Lyon, Université, Lyons, France). *Experimental Brain Research*, vol. 13, no. 5, 1971, p. 533-546. 39 refs. Research supported by the Institut National de la Santé et de la Recherche Médicale; Direction des Recherches et Moyens d'Essais Grant No. 70-036; Contract No. F61052-70-C-0034.

The activity of 83 single lateral geniculate body neurons was recorded in encéphale isolé cats during nystagmic eye movements induced as an aftereffect of electrical stimulation of the lateral vestibular nucleus. Phasic changes in firing, time-locked with the eye movements, were found in 66 per cent of the neurons, by a method using the saccades to trigger a 'postsaccadic'-time histogram of the corresponding neuronal discharge. The onset of the postsaccadic change showed an average latency of about 100 msec from the onset of the movement. The change could be either an increase, or a decrease in firing in both light and dark, or a change evident in one condition only, or even a reversal of the pattern of the change by shifting from one condition to the other. The results are discussed in connection with theories on visuo-motor mechanisms that counteract illusory shifts of visual field during active eye movements. O.H.

A72-13624 **Contrast enhancement in a Hermann grid with variable figure-ground ratio.** L. Spillmann (Retina Foundation, Boston, Mass.) and J. Levine (MIT, Cambridge, Mass.). *Experimental Brain Research*, vol. 13, no. 5, 1971, p. 547-559. 10 refs. Research supported by the John A. Hartford Foundation; PHS Grant No. EY-00227.

Psychophysical experiments on contrast vision were made using a modified Hermann grid which was graded in two directions. This pattern was composed of intersecting (IG) and intersected stripes (ID) representing 15 shades of a gray scale, and was viewed against five uniform backgrounds (BGD) ranging from white to black. Illusory light and dark patches at intersections were essentially limited to IGs that ranged in reflectance between BGD and ID. 'Brighter' responses were evoked by a white BGD and 'darker' responses by a black BGD; gray BGDs elicited both kinds of responses. The contrast effects were more pronounced for vertical and horizontal than for diagonal grid orientation. An optimum grid was devised that shows maximum brightness changes at almost every intersection. The observations are interpreted in terms of Baumgartner's receptive field hypothesis. O.H.

A72-13676 # **Effect of training on oxygen consumption in negative muscular work.** K. Klausen and H. G. Knuttgen (Copenhagen, University, Copenhagen, Denmark). *Acta Physiologica Scandinavica*, vol. 83, Nov. 1971, p. 319-323. 13 refs.

During negative work (bicycling downhill on a motordriven treadmill), it was found in three young, male subjects that the oxygen consumption continued to increase over a 25-50 min exercise period. The increase from the 10-th to the last minute of exercise was more than 25%. After 3-5 weeks of training with negative work of higher numerical work intensity, a marked decrease in oxygen consumption was seen, and the continuous increase in oxygen consumption during the exercise period was reduced to a minimum, when the subjects worked at the same work intensity as before the training period. The direct employment of energy received by the muscles during negative work in the contraction process is discussed as a possible explanation for the reduced aerobic metabolism. Strengthening of the connective tissue during training and changes in muscle viscosity due to changes in muscle temperature are suggested as other possible factors involved in the decrease in oxygen consumption. (Author)

A72-13677 # The effect of acute and chronic hypercapnia upon the lactate, pyruvate, alpha-ketoglutarate, glutamate and phosphocreatine contents of the rat brain. K. Messeter (University Hospital, Lund, Sweden) and B. K. Siesjö (Lund, University, Lund, Sweden). *Acta Physiologica Scandinavica*, vol. 83, Nov. 1971, p. 344-351. 18 refs. Research supported by the Swedish Medical Research Council, the Swedish Bank Tercentenary Fund, and the C.-B. Nathorst's Vetenskapliga Stiftelse; NIH Grant No. 5-R01-NS-07838-02.

Acute hypercapnia was associated with highly significant decreases in the lactate, pyruvate, alpha-ketoglutarate, glutamate and phosphocreatine contents. In sustained hypercapnia, the lactate, pyruvate and alpha-ketoglutarate contents were partially restored but phosphocreatine and glutamate remained decreased. The results suggest that the intracellular lactate/pyruvate ratio is affected both by changes in the intracellular pH and by changes in the cytoplasmic NADH/NAD(+) ratio. M.M.

A72-13678 # The influence of physical training and other factors on the subjective rating of perceived exertion. B. Ekblom (Gymnastik-och Idrottshögskolan, Stockholm, Sweden) and A. N. Goldbarg. *Acta Physiologica Scandinavica*, vol. 83, Nov. 1971, p. 399-406. 12 refs. Research supported by the Swedish National Association against Heart and Chest Diseases, the Délégation Générale à la Recherche Scientifique et Technique, and the Swedish Sports Federation.

The relationship between the subjective rating of perceived exertion (RPE) and different physiological variables during work were investigated in 19 healthy subjects under the following conditions: (1) after heart rate (HR) has been experimentally changed during work by the use of autonomic nervous system blocking agents; (2) during different types of physical work; and (3) before and after an 8 week period of physical training, respectively. In most work situations, HR mirrors the physical strain subjectively experienced. However, this correlation between HR and RPE was altered during the experiments with blocking agents. Therefore, a tachycardia as such is not the primary factor in the setting of HR during exercise - RPE was higher for a given level of oxygen uptake during arm work than during leg work, as well as during bicycling compared to running or swimming. A better correlation was found in these experiments between RPE and blood lactate concentration. After training, and in parallel to the decrease in HR at submaximal work loads, RPE was lower for a given level of oxygen uptake, but was the same when related to the 'relative' (per cent of maximum) oxygen uptake. (Author)

A72-13693 * Radiological physics characteristics of the extracted heavy ion beams of the bevatron. C. A. Tobias, J. T. Lyman, A. Chatterjee, J. Howard, H. D. Maccabee, M. R. Raju, A. R. Smith, J. M. Sperinde, and G. P. Welch (California, University, Berkeley, Calif.). *Science*, vol. 174, Dec. 10, 1971, p. 1131-1134. AEC-NASA-supported research.

Studies of the depth-ionization properties and the biological effects of heavy ion beams produced at the bevatron have extended work previously done with less energetic beams from other sources. Results indicate that heavy ion beams are suitable for tumor therapy, studies relating to space biology, and fundamental radiobiology. (Author)

A72-13698 # Two safer aircraft instruments. R. Oswalt (Skidmore College, Saratoga Springs, N.Y.) and T. Landau (Brooklyn College, Brooklyn, N.Y.). *Astronautics and Aeronautics*, vol. 9, Dec. 1971, p. 56, 57.

Demonstration of the dangers inherent in two commonly used flight instruments - namely, the altimeter and the artificial horizon. In tests of both experienced pilots and completely inexperienced subjects a large number of errors in reading these instruments were detected. The existence of alternative, more easily readable instruments is noted, and it is recommended that these modified instruments be used instead of the standard instruments. A.B.K.

A72-13700 Heat transfer through fabrics as related to thermal injury. A. M. Stoll and M. A. Chianta (U.S. Naval Material Command, Aerospace Medical Research Dept., Warminster, Pa.). *New York Academy of Sciences, Transactions, Series 2*, vol. 33, Nov. 1971, p. 649-670. 10 refs.

Heat is transferred through fabrics by convection, conduction, and radiation and, under certain circumstances, by vaporization. Each mode is subject to different physical principles, but the effect of the total heat absorbed by underlying skin is the same. If the resultant skin temperature rise is sufficiently high and maintained sufficiently long, injury results. The extent of injury is predicted under certain controlled conditions, and these conditions may be used to disclose protection principles appropriate to each mode of transfer. (Author)

A72-13721 # Significance of the characteristics of the functional state of the organism for the estimation of mental working capacity (Znachimost' pokazatelei funktsional'nogo sostoiianiia organizma v otsenke umstvennoi rabotosposobnosti). V. P. Zagriadskii, A. S. Egorov, and B. N. Iakovets. *Voenno-Meditsinskii Zhurnal*, Sept. 1971, p. 59-62. In Russian.

The existence of a relation between the functional state and the brain performance of a human organism is discussed in the light of available studies. Experiments are reviewed and statistical data are quoted to demonstrate that evidence for such a relation frequently fails to come up. It is also contended that functional tests frequently fail to give the general picture of the functional state of an organism as a whole. Direct mental performance tests are suggested as a more reliable approach to the assessment of mental working capacity. V.Z.

A72-13722 # Prevention of fainting in flying personnel (Preduprezhdenie obmorochnykh sostoianii n letnogo sostava). P. D. Martimonov. *Voenno-Meditsinskii Zhurnal*, Sept. 1971, p. 63-66. In Russian.

The causes of fainting are discussed. Constitutional susceptibility, minor health irregularities, temporal weakness due to alcohol, heavy smoking, lack of sleep, and emotions are noted as the contributing factors. Checking of health background and medical and personnel histories for proneness to fainting is recommended for prevention of fainting cases among flying personnel. V.Z.

A72-13723 # Experimental and psychological examination of airmen with erroneous action records (Eksperimental'no-psikhologicheskoe obsledovanie letchikov, dopuskavshikh oshibochnye deistviia). A. D. Solov'ev, M. S. Liaskovskii, and G. I. Sychev. *Voenno-Meditsinskii Zhurnal*, Sept. 1971, p. 66-68. In Russian.

Airmen with performance error histories were subjected to psychological tests to group them according to the fitness of their psychic characteristics for the profession. Two particular cases of pilots with error records are discussed in detail to demonstrate how a careful consideration of individual psychic characteristics can be helpful in keeping pilots in the profession by adjustment to limited assignments. V.Z.

A72-13724 # A device for constraining the eye movement angle during nystagmograph calibration (Ustroistvo dlia ogranicheniia ugla dvizheniia glaz pri tarirovke nistagmografov). I. A. Sidel'nikov and N. B. Platonov. *Voenno-Meditsinskii Zhurnal*, Sept. 1971, p. 91-94. In Russian.

Description of portable and miniature devices for eye movement control in electronystagmography. Essential in these devices are sets of flashlight bulbs enclosed in panels with holes which facilitate the measurement of eye motion angles from 2.5 to 60 deg during nystagmus tests. Line drawings and the basic circuit of the devices are given. V.Z.

A72-13847 Clinical significance of the coronary arteriogram. D. C. Banks, E. B. Raftery, and S. Oram (King's College Hospital, London, England). *British Heart Journal*, vol. 33, Nov. 1971, p. 863-870. 17 refs. Research supported by the Wates Foundation.

Description of a method for scoring the degree of obstruction of all three coronary arteries as revealed by coronary arteriography so that the disease process as a whole can be assessed. This score has been correlated with the clinical details of 107 patients having ischaemic heart disease, rheumatic heart disease, or both. It was not possible to find a close relation between the particular artery diseased and the area of myocardial damage as predicted from the EKG either at rest or on exercise. Neither the EKG nor clinical diagnosis of myocardial infarction, alone or together, correlated with complete obstruction on the arteriogram. This method of scoring coronary arterial disease is believed to be a practical objective means of assessing the clinical significance of the coronary arteriogram. M.M.

A72-13850 # Gravitation receptor: Evolution of the structural, cytochemical, and functional organization (Retseptor gravitatsii: Evoliutsiia strukturnoi, tsitokhimicheskoi i funktsional'noi organizatsii). Ia. A. Vinnikov, O. G. Gazenko, L. K. Titova, A. A. Bronshtein, T. P. Tsurulis, R. A. Pevzner, V. I. Govardovskii, F. G. Gribakin, V. P. Ivanov, and M. Z. Aronova. Leningrad, Izdatel'stvo Nauka (Problemy Kosmicheskoi Biologii. Volume 12), 1971. 534 p. 532 refs. In Russian.

Cytochemical, cytophysiological, and electron-microscopic research data are given for the development of the structural, cytochemical, and functional organization of the gravitation receptor in invertebrates (statocyst) and vertebrates (vestibular apparatus). The material presented is used to interpret the operational mechanisms of the gravitation receptor at the cellular, subcellular, and molecular levels. The corresponding organs in various animals are illustrated, and their functional features are described together with observed developmental processes. T.M.

A72-13855 # Studies on stabilized human plasma protein solution. Y. Gabr, M. H. Soliman, S. Dawoud, A. El-Molla, and E. S. Amin (Medical Research Institute; Alexandria, University, Alexandria, Egypt). *Acta Biologica et Medica Germanica*, vol. 27, no. 2, 1971, p. 341-349. 26 refs.

A stabilized human plasma protein solution has been prepared by heating citrated plasma for one hour at 70 C in the presence of 0.04 N sodium caprylate at pH 7.0. Immunological analyses show that this plasma protein solution contains albumin which gives a reaction of complete identity with human serum albumin, and one precipitin line similar in shape and position to that of human serum albumin. Chemical analyses of this plasma protein solution show that the recovery of albumin is more than 93% of the original plasma albumin. There is a significant rise in nonprotein nitrogen and polypeptide index of the plasma after heart treatment. Only 40% of total cholesterol and no lipase activity can be directed after heating. The concentrations of calcium, total, lipid and inorganic phosphorus become also less in this plasma protein solution. (Author)

A72-13867 * # Biomedical findings on American astronauts participating in space missions. C. A. Berry (NASA, Washington, D.C.). *Akademiia Nauk SSSR, International Astronautical Federation, and World Health Organization, International Symposium on Basic Environmental Problems of Man in Space*, 4th, Yerevan, Armenian SSR, Oct. 1-5, 1971, Paper. 24 p. 17 refs.

Zero-gravity adaptive responses of man are discussed on the basis of biomedical data for 54 American astronauts, covering performance, locomotion, orientation, sleep and physiological and functional characteristics. Figures and diagrams are given for cardiovascular adaptation, weight loss, endocrine and electrolyte responses, fluid balance, skeletal responses, muscular and neuromuscular changes, exercise response tests and work capacity indicators. A review is given of current hypotheses concerning the processes involved in human adaptation to zero gravity. It is concluded that the immediate response of the body to weightlessness is a redistribution of the total circulating blood volume, leading to a loss of water, sodium and potassium through the kidneys and, thus, to a loss in total body weight. V.Z.

A72-13878 Influence of concurrent and terminal exposure conditions on the nature of perceptual adaptation. J. J. Uhlarik and L. K. Canon (Washington, University, Seattle, Wash.). *Journal of Experimental Psychology*, vol. 91, Dec. 1971, p. 233-239. 18 refs. NSF Grant No. GB-7693.

The Ss viewed their own localizing movements through a laterally displacing prism as they pointed at a visible target. In the Concurrent Exposure condition, the pointing arm was visible throughout its excursion from resting place to target, while in the Terminal Display condition it could be seen only at the termination of a pointing movement. L. K. Canon's model of the process of adaptation holds that compensatory shifts in localization manifest themselves primarily in the modality not attended to or employed as a source of information for localizing responses. With terminal display conditions during exposure to the intermodality inconsistency, where Ss were likely to attend to proprioceptive cues in making their localizations, subsequent shifts in the position selected as the visually straight ahead were found. With concurrent display conditions, where exposure period localizations would be expected to be based on visual cues, shifts in the arm position felt to be straight ahead occurred. The relevance of these findings to prior research on interlimb transfer of adaptation was discussed. (Author)

A72-13879 Visual guidance of locomotion. K. R. Llewellyn (Sydney, University, Sydney, Australia). *Journal of Experimental Psychology*, vol. 91, Dec. 1971, p. 245-261. 9 refs. Research supported by the Department of Civil Aviation and the Department of Supply.

It is argued that guidance situations requiring accuracy involve locomotion toward a specific target. The perceptual information for this guidance is provided by the movement of this target, the presence and nature of any drift signaling the presence of a heading error and the nature of the correction required. The rejection of expansion information judgments as the probable basis of guidance is based on the lack of response variation with variation of the stimulus display (at times extreme) and the high degree of inaccuracy consistently displayed. No improvement in accuracy occurred with variation of the viewing conditions, nature of the displays, and nature of the task, or from the use of monocular or binocular vision, free viewing or fixation, sophisticated subjects, and extensive instruction in the nature of the expansion pattern. M.M.

A72-13881 * The relation of QRS amplitude to the frontal QRS axis and the heart-electrode distance. J. D. Dougherty (Harvard University, Boston, Mass.) *Journal of Electrocardiology*, vol. 4, no. 3, 1971, p. 249-260. 16 refs. Grant No. NGT-22-007-008.

The relation between QRS amplitude, QRS axis deviation and heart position was studied in 360 subjects, using the 12-lead EKG. The height of the V sub 6 R wave was used as the measure of QRS amplitude. The distance from the left lateral border of the heart was used to indicate heart position. The frontal and horizontal QRS axes were determined by noting the isoelectric limb and precordial leads, measured according to Schmitt's values. M.M.

A72-13884 # The universal perception meter (Az univerzális percepcióméter). S. Mitró. *Mérés és Automatika*, vol. 19, no. 10, 1971, p. 385-389. 9 refs. In Hungarian.

Description of a psychological measuring device, called the universal perception meter, which is an important testing instrument in work psychology laboratories. The characteristics of the instrument are presented, and the operation of the automatic stimulator unit and the analyzer unit is discussed. The automatic stimulator transmits test signals (visual or auditory stimuli) to the subject, while the analyzer evaluates the subject's response. A digital recorder can be connected to the device to confirm the measured values. A.B.K.

A72-13935 Photopic spectral curves of relative luminous efficiency in cases of congenital deficiencies of color vision (Les courbes spectrales photopiques d'efficacité lumineuse relative dans les déficiences congénitales de la vision des couleurs). G. Verriest (Gent, Rijksuniversiteit, Ghent, Belgium). *Vision Research*, vol. 11, Dec. 1971, p. 1407-1434. 88 refs. In French.

Using an optical bench, interference filters, and a Bachstein flicker photometer, spectral curves of luminous efficiency relative to that of a 552 nm radiation have been determined at retinal illumination levels of 55 and 415 trolands for several protanope, protanomalous, deutanope, and deutanomalous subjects, as well as for several typical achromates and for one atypical 'blue monocone monochrome'. Twenty-five normal subjects of the same age have been used for reference. Results are discussed and analyzed. O.H.

A72-13936 Sensitization by annular surrounds - Sensitization and masking. D. Y. Teller, C. Matter, W. D. Phillips, and K. Alexander (Washington, University, Seattle, Wash.). *Vision Research*, vol. 11, Dec. 1971, p. 1445-1458. 29 refs. PHS Grant No. EY-00421.

The influence of spatial interactions on the rapid changes in the rod threshold which occur in early light and dark adaptation (masking) is examined. Early light and dark adaptation curves were traced with a 5 min test spot centered upon adapting disks of light of various diameters, from 12 min to 3 deg of arc. Standard early light and dark adaptation curves were found on the larger sizes of the disks, with a clear maximum in the threshold occurring near or slightly after the instant of onset of the disk, and a secondary maximum at or near the instant of offset of the disk. For the smaller range of disks, however, both the rise and the fall of the threshold were monotonic, with no maxima near disk onset or offset. These data suggest that the threshold maximum of early light adaptation results from the interaction of center and surround processes of neural units. O.H.

A72-13937 Brightness contrast at low luminances. M. Hollins (Brown University, Providence, R.I.). *Vision Research*, vol. 11, Dec. 1971, p. 1459-1472. 30 refs. PHS Grant No. 5-RO1-EY00193.

The problem of whether simultaneous brightness contrast also occurs under scotopic conditions is investigated. In addition, the possibility is explored that the rod and cone systems interact within the framework of brightness contrast. As a result, simultaneous

brightness contrast was found to occur below cone threshold. The rod action spectrum of the phenomenon, and its lack of a Stiles-Crawford effect, argue that it is mediated by the scotopic system. In additional experiments, a parafoveal scotopic annulus was found not to darken a foveal test spot; but a 7-deg-peripheral test spot, designed to stimulate predominantly cones, was darkened by a scotopic annulus. This last experiment suggests that the rod and cone systems may sometimes interact within the framework of brightness contrast. O.H.

A72-13938 Fragmentation and closure in after-images. A. H. Gregory and P. Arnold (Manchester, Victoria University, Manchester, England). *Vision Research*, vol. 11, Dec. 1971, p. 1473-1477. 6 refs.

A stimulus consisting of a bright line with a small gap in the center was observed as the after-image of a bright flash. The proportions of time for which fragmentation of the stimulus and closure of the gap occurred were recorded in two conditions: with the whole stimulus seen with one eye, and with the two halves of the line seen with different eyes. In the after-image there was more fragmentation and less closure when the two halves of the line were presented to different eyes. A possible explanation is suggested in terms of adaptation of 'line detector' units in the visual cortex. O.H.

A72-13939 Observations with Ishihara charts at low colour temperatures, low light intensity and limited exposure time. H. Kalmus (University College, London, England). *Vision Research*, vol. 11, Dec. 1971, p. 1487-1490. Research supported by the Medical Research Council.

Readings of Ishihara charts in artificial daylight by normal and color defective subjects were tested. It is shown that single exposures of somewhat longer duration (1 or 5 sec) in the light of 3200 deg K and 1.2 ft-cd produces normal readings in color normal people but has a number of novel effects on the readings of color defectives, probably by constraining some searching mechanisms involving nervous feedback. O.H.

A72-13989 # Fast and slow fibers in human muscles (Быстрые и медленные волокна в мышцах человека). N. V. Zimkin, V. G. Panov, and V. T. Raikov (Institut Fizicheskoi Kul'tury, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Sept. 1971, p. 1259-1266. 22 refs. In Russian.

Temporal response characteristics of fast and slow muscle fibers stimulated by single electrical pulses were measured in eight human muscles. Tensometric records revealed single- and multipeak curves of muscle hardness variation. Fibers with different contraction rates were identified by the time required to reach the peak from the onset of contraction. Both fast and slow fibers in different muscles of the same subject and fibers in the same muscles of different subjects are shown to differ from each other by temporal characteristics of the contractile properties. Groups of fast and slow fibers represent characteristic families of fibers with similar contractile properties. T.M.

A72-13990 # Coordination of postural tonic activity of muscles in man (O koordinatsii poznotonicheskoi aktivnosti myshits u cheloveka). Iu. Z. Zakhar'ants (Institut Fizicheskoi Kul'tury, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Sept. 1971, p. 1267-1274. 29 refs. In Russian.

It is demonstrated that the maintenance of different postures by the human body is characterized by muscular electrical activity

which differs in magnitude and character. Natural body postures are characterized by a low voltage of the action potentials and by the presence of a phase component and gain periodicity in the asynchronous muscular activity. During unaccustomed postures, the tension of the most active muscles is in most cases characterized by asynchronous activity of substantial amplitude. Synchronized high-amplitude action potentials occur together with asynchronous activity during difficult postures, and the phase component of muscular activity disappears. T.M.

A72-13991 # Parameters of the oxygen metabolism in the skeletal muscles of adrenalectomized rats after physical strain (O parametrah kislородnogo obmena v skeletnykh myshtsakh adrenektomirovannykh kryss posle fizicheskoi nagruzki). L. A. Isaakian, G. Ia. Breido, I. M. Epshtein, L. S. Maslennikova, and L. M. Zhelnakova (Akademiia Nauk SSSR, Institut Fiziologii and Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad; Vsesoiuznyi Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Sept. 1971, p. 1293-1297. 23 refs. In Russian.

The free oxygen content and the oxygen diffusion coefficient were measured in vivo in the muscles of adrenalectomized and intact rats during recovery after physical strain. Short-term physical exercise (swimming) is shown to be a stress factor which gives rise to deep and prolonged hypoxic effects and which hinders oxygen diffusion in the skeletal muscles of adrenalectomized rats. These animals show inefficient utilization of oxygen during recovery from physical strain. T.M.

A72-14032 Comparison of potential device interference and biological exposure hazards in microwave leakage fields. J. M. Osephchuk (Raytheon Co., Research Div., Waltham, Mass.). In: *International Electromagnetic Compatibility Symposium*, Philadelphia, Pa., July 13-15, 1971, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1971, p. 155-161. 16 refs.

The potential for interference in devices including medical devices and instrumentation exposed to leakage or stray fields of microwave sources is explored. A study of semiconductor devices in arbitrary circuitry suggests a maximum potential interference in microwave fields. Experimental data on interference of demand pacemakers in microwave fields is reviewed in the context of electromagnetic compatibility. Potential interference levels are far below biological exposure hazard levels. Effective methods of reducing susceptibility of devices to microwave radiation are shown to include shielding and filtering techniques. (Author)

A72-14246 # Psychological features of astronaut activity (Psikhologicheskie osobennosti deiatel'nosti kosmonavtov). A. A. Leonov and V. I. Lebedev. Moscow, Izdatel'stvo Nauka, 1971. 256 p. 218 refs. In Russian.

The role of astronauts in the man-spacecraft system is examined from the viewpoints of crew teamwork requirements in a multiple-member mission and psychological training measures for human operators. Variations in living conditions during space flight are described together with corresponding changes in the psychophysiological mechanisms of space and time perception. The effects of weightlessness, prolonged isolation in restricted confinement, emotional stress, and other flight factors on the perception of time by man are explained, and the motor activity of an astronaut in a state of weightlessness is analyzed. Astronaut training to maintain orientation in prolonged flights, the organization of rest and work cycles in prolonged interplanetary missions, and the development of improved man-machine interface facilities are also examined. T.M.

A72-14442 Ventricular function in idiopathic hypertrophic subaortic stenosis - A ballistocardiographic and angiographic correlative study. D. H. Jackson, E. E. Eddleman, Jr., W. H. Bancroft, Jr., and R. H. Swatzell, Jr. (Alabama, University; U.S. Veterans Administration Hospital, Birmingham, Ala.). *American Journal of Cardiology*, vol. 28, Dec. 1971, p. 641-647. 15 refs. PHS Grants No. HE-11310; No. HE-05737.

Patients with idiopathic hypertrophic subaortic stenosis were studied by ballistocardiographic and angiographic techniques. A number of statistically significant differences were found between those with hypertrophic subaortic stenosis and normal subjects of similar age range. This ballistocardiographic study confirms findings of previous studies showing a greater early systolic contractile force in these patients with hypertrophic subaortic stenosis and more rapid acceleration of emptying. Correlation studies indicate that certain ballistocardiographic variables may quantitatively reflect ventricular function. Therefore, we have shown that relating ballistocardiographic measurements to dynamic variables may be useful in considering ventricular abnormality. It is strongly suggested that the relation of the ballistocardiogram to ventricular function is the major value inherent in the wave forms. Previous rejection of the ballistocardiogram as a useful clinical device or as an investigative technique appears to have been premature. (Author)

A72-14443 Familial cardiomyopathy - A review of 11 families. I. Kariv, L. Sherf, S. Feldman, T. Rosenthal (Tel-Hashomer Government Hospital, Tel-Hashomer; Tel Aviv University, Tel Aviv, Israel), and B. Kreisler. *American Journal of Cardiology*, vol. 28, Dec. 1971, p. 693-706. 19 refs.

Findings in eleven families with cardiomyopathy, collected during a period of approximately a decade, are reviewed. Of 98 persons examined, 47 were affected. The clinical findings included palpitations, arrhythmias, syncope, and sudden death; some patients had intractable congestive heart failure and Stokes-Adams attacks. Rhythm disturbances, left ventricular hypertrophy, intraventricular conduction defects, and abnormal Q waves were frequent. The prognosis is uncertain. The electrocardiogram proved to be the best single tool for detection of cardiomyopathy. Of special interest were the dynamic changes in the electrocardiogram with the disappearance of the abnormal Q waves and infarction-like patterns with advancing age, as well as appearance of left bundle branch block. Serum enzyme disturbances were detected in some families, and their possible significance is discussed. O.H.

A72-14445 * Lighting factors affecting the visibility of a moving display. R. D. Gilson (U.S. Naval Aerospace Medical Center, Aerospace Medical Institute, Pensacola, Fla.). *Perception and Psychophysics*, vol. 10, Dec. 1971, p. 400-402. 10 refs. NASA-Army-Navy-sponsored research.

Compensatory tracking performance was shown to be substantially degraded by oscillation of the visual display at both 1.0 and 2.0 Hz. The severity of this decrement was altered significantly by changes in both the color and the intensity of the display illumination. Performance was significantly better with red light illuminating the display at 0.05 mL than with blue light at the equivalent luminance. This improvement in performance was similar in magnitude to that found for an increase in broad-band illumination of the display where luminance was increased from 1/2 log unit below to 1/2 log unit above 0.05 mL. Visual mechanisms that may have been responsible for these findings are suggested. (Author)

A72-14474 Effects of alcohol ingestion on tracking performance during angular acceleration. W. E. Collins, D. J. Schroeder (FAA, Civil Aeromedical Institute, Oklahoma City, Okla.), R. D. Gilson, and F. E. Guedry, Jr. (U.S. Navy, Aerospace Medical Research Laboratory, Pensacola, Fla.). *Journal of Applied Psychology*

gy, vol. 55, Dec. 1971, p. 559-563. 10 refs. FAA-Army-Navy-sponsored research.

Following practice and baseline tests of tracking performance in both static (stationary) and dynamic (whole body angular acceleration) conditions, ten subjects received orange juice that contained 2.0 ml. of 100-proof vodka per kilogram of subject weight; others drank a control beverage. Tests, conducted 1-10 hr after drinking, were in total darkness with the exception of the illuminated visual display. Static tracking errors for alcohol subjects were significantly higher than those of controls only at the 4-hr session. However, alcohol subjects made significantly more dynamic tracking errors during the 1-, 2-, and 4-hr sessions and, concomitantly, had significantly more nystagmic eye movements and higher rates of slow phase eye velocity than did controls. Although eye-hand coordination may show little or no impairment following alcohol ingestion in static situations, it may be seriously degraded during motion.

(Author)

A72-14567 Study of times of tolerance to hypoxia among pupil pilots in the course of their aeromedical instruction in a decompression chamber (Etude des temps de tolérance à l'hypoxie chez des élèves pilotes, au cours de leur instruction aéromédicale en caisson à dépression). G. Chatelier, M. Gouars, M. Guillermin, G. Santucci (Ministère des Armées, Service de Santé des Armées, Paris, France), P. Galban, and C. Benceny. *Revue des Corps de Santé des Armées*, vol. 12, Oct. 1971, p. 515-542. 16 refs. In French.

Results of simulated climbs to high altitudes, using a decompression chamber to demonstrate to pupil pilots the effects of anoxia caused by failure of the oxygen supply. It was found that most of the subjects put into sudden anoxia at different altitudes seemed to resist the effects of low partial oxygen much longer than classical data would predict. The new data discussed were obtained by electroencephalograms and recordings of the cardiac rhythm. F.R.L.

A72-14569 Reflections on the medicopsychological surveillance of aircrew in fighter pilot school - The time in pilot training (Réflexions sur la surveillance médico-psychologique du personnel navigant en école de chasse - Le temps dans l'apprentissage au pilotage). H. Moreau (Armée de l'Air, Centre Médical de Psychologie Clinique, Paris, France). *Revue des Corps de Santé des Armées*, vol. 12, Oct. 1971, p. 579-583. In French.

Consideration of medicopsychological problems, with attention to psychological stress in ground school; minor ailments, some of which may be psychosomatic; and air sickness in the early stages of the course, which may also be of psychological origin. Account must be taken of human factors as well as of the pressing need to meet the requirements for personnel and to develop the planning of the school. An overall and dynamic perspective of psychology puts the accent on concepts of maturity where the time factor appears to be very important. F.R.L.

A72-14573 Introduction to system safety engineering. W. P. Rodgers (Rodgers Management, Norman, Okla.; TRW Systems Group, Redondo Beach, Calif.). New York, John Wiley and Sons, Inc., 1971. 130 p. \$9.95.

Three primary concerns are dealt with: what system safety engineering is, what it can do for project and product management, and how it can be implemented. The general topic of safety within product development is considered first. This is followed by a discussion detailing the chronological sequence of events from which system engineering evolved. By presenting this history, a foundation is established on which the strong and weak points of the practical application of system safety engineering can be discussed. Subsequent chapters are devoted to product management, analysis techniques, the system safety engineering data bank, product

assurance, industry safety, and product liability. Three appendices present a typical system safety program plan, typical safety design criteria, and a military standard of requirements for a system safety program for systems, associated subsystems, and equipment. O.H.

A72-14606 # Problem of biological dosimetry in the acute irradiation of men (Zur Frage der biologischen Dosimetrie bei akuter Bestrahlung des Menschen). L. I. Dvoretzki, V. N. Pokrovskaja, and A. E. Mel'nikova. *Radiobiologia - Radiotherapia*, vol. 12, no. 2, 1971, p. 233-241. 34 refs. In German. (Translation).

The possibilities of a biological dosimetry of men using the cytogenic study of the peripheral blood and bone marrow are discussed. It is believed that the cytogenic examination of a culture of peripheral blood is most favorable in the determination of an integrated radiation dose. In the case of nonuniform irradiation, the analysis of chromosomes of bone marrow cells taken from different areas of the body must be used to obtain the degree of dose distribution. The possibility of biological dosimetry with the estimate of uniform irradiation is illustrated by means of two cases of uncontrolled gamma ray irradiation. M.M.

A72-14607 # Proliferative activity of blood-forming tissues under conditions of chronic experimental gamma-ray irradiation (Die proliferative Aktivität der blutbildenden Gewebe unter den Bedingungen der experimentellen chronischen gamma-Bestrahlung). O. I. Belousova and M. I. Fedotova. *Radiobiologia - Radiotherapia*, vol. 12, no. 2, 1971, p. 243-250. 13 refs. In German. (Translation).

The reactions of blood-forming organs were studied by means of quantitative methods of evaluation in experiments with guinea pigs exposed to chronic gamma-ray irradiation. Considerable disturbances were observed in the myeloid germ of the bone marrow. At the same time, with the suppression of the proliferative activity of the early myeloid cell generations, a decrease in the transformation of the reticular cells was found. The present disturbance is not obvious in the erythroid germ. The absolute count of lymphoid cells in the spleen, in the femoral bone marrow and in the peripheral blood of guinea pigs after total doses of 600, 800, 1000, 1600 and 1850-2000 R does not virtually differ from the controls. M.M.

A72-14608 # Radiochemical changes in the pyrimidine bases of nucleic acids. E. Jászsgai-Nagy (Magyar Tudományos Akadémia, Budapest, Hungary). *Radiobiologia - Radiotherapia*, vol. 12, no. 3, 1971, p. 311-318. 19 refs.

Various photochemical reactions take place in the pyrimidine bases of nucleic acids as a result of UV and ionizing radiation. The dimerization of the thymine base occurring in DNA is the lesion which shows the most constant character. The possibility that pyrimidine reactions to irradiation observed in vitro may be demonstrated in bacteria also in vivo has been investigated. It has been found that the photochemical products forming at the irradiations of aqueous DNA solution and in DNA isolated from an irradiated bacterium culture are the same as have been recorded at the irradiation of the bases. It would seem that the mutagenic and lethal effect of UV in the case of bacteria is mainly the result of the dimerization of the thymine molecule. M.M.

A72-14609 # Examination of carbohydrate metabolism and leucocyte size under the influence of ionizing radiation (Untersuchungen des Kohlehydratstoffwechsels und der Grösse der Leukozyten unter dem Einfluss ionisierender Strahlen). P. Gerhardt (Tübingen, Universität, Tübingen, West Germany). *Radiobiologia - Radiotherapia*, vol. 12, no. 3, 1971, p. 347-352. 16 refs. In German.

The activities of glycolytic ferments G-6-PDG and 6-PGDH of the leucocytes of irradiated and unirradiated rabbits as well as therapeutically irradiated patients were measured. Granulocyte and lymphocyte size was determined. The investigations revealed an increase in ferment activities and granulocyte size with increasing leukopenia. The results are considered a sign of a compensatory balance in the cell formation of the bone marrow with radiation-induced leukopenia.

M.M.

A72-14610 # Biological effects of laser radiation. E. Mester (Budapesti Műszaki Egyetem, Budapest, Hungary) and E. Jászszági-Nagy (Magyar Tudományos Akadémia, Budapest, Hungary). *Radio-biologia - Radiotherapia*, vol. 12, no. 3, 1971, p. 377-385. 18 refs.

The effects of the unfocused laser radiation in the culture of a thymine requiring *E. coli* strain have been examined. Cell multiplication has been shown to be progressively retarded by exposure to laser radiation. While oxygen consumption is usually little altered by laser treatment, there are drastic derangements in the synthetic metabolism of the cell, DNA is easily inhibited, and RNA synthesis is less sensitive. Numerous studies indicate that low-intensity laser radiation produces stimulation of certain biological activities. The rate of DNA and RNA synthesis increases depending on the dose applied. M.M.

A72-14703 Biomechanics II; Proceedings of the Second International Seminar, Eindhoven, Netherlands, August 25-29, 1969. Seminar supported by the Netherlands Ministry of Education and Science and the Netherlands Sports Federation. Edited by J. Vredenburg and J. Wartenweiler. Baltimore, Md., University Park Press (Medicine and Sport. Volume 6), 1971. \$22.50.

Topics discussed concern the integrative action of the nervous system, muscular coordination, the motor learning process, the kinetics of human motion, human motion in sports, and research in rehabilitation. The contents show an increasing knowledge of muscle coordination by analysis and synthesis of (1) the muscle properties and characteristics, and (2) the innervation pattern and function of the nervous system. This makes it possible to design functional models of which some examples are shown and which may be important in constructing and programming artificial limbs. Some interesting contributions regarding the motor learning process stress the complexity of the nervous system.

A.B.K.

A72-14704 Experiences with spinal reflexes in research of the human motor system. C. H. M. Brunia. In: Biomechanics II; Proceedings of the Second International Seminar, Eindhoven, Netherlands, August 25-29, 1969. Baltimore, Md., University Park Press, 1971, p. 39-47. 10 refs.

Results of experiments in evoking spinal reflexes through stimulation of the gastrocnemius and soleus muscles in both legs. In an experiment in which Hoffmann reflexes and Achilles tendon reflexes were evoked simultaneously an increase in the amplitudes of the tendon reflexes was noted without clear changes in the Hoffmann reflexes. These increased amplitudes are attributed to a hyperactivation of the gamma motoneurons. In studying the recovery cycle of the Hoffmann and tendon reflexes in a hemiparetic patient, it is found that a higher facilitation level is reached in the hemiparetic limb with respect to both Hoffmann and tendon reflexes.

A.B.K.

A72-14705 Control system aspects of muscular coordination. J. H. Milsum (McGill University, Montreal, Canada). In: Biomechanics II; Proceedings of the Second International Seminar, Eindhoven, Netherlands, August 25-29, 1969. Baltimore, Md., University Park Press, 1971, p. 62-71. 10 refs.

Consideration of the organizing principle or optimizing strategy involved in neuromuscular coordination. An attempt is made to show how the overall coordinating operation may be programmed temporally, both as to the initial learning and to on-line adaptation. Evolutionary criteria governing the selection mechanisms operating in neuromuscular coordination are reviewed, as well as neuromuscular control structure and strategies. A neuromuscular control actuating mechanism proposed by Aizerman and Andreeva (1968) is discussed, as well as some work by Griffith (1963) on the learning of spinal reflexes. The possibility of preprogrammed control, where specific movements are controlled on an open-loop basis, and feedback loops operate in a monitoring role, is considered, and an experimental program on neuromuscular control mechanisms is described.

A.B.K.

A72-14706 The formation of a competitive motor response by operant conditioning. C. Y. Jeanrenaud, A. G. Linford, M. V. Frye (Illinois, University, Champaign, Ill.). In: Biomechanics II; Proceedings of the Second International Seminar, Eindhoven, Netherlands, August 25-29, 1969. Baltimore, Md., University Park Press, 1971, p. 109-113. 15 refs.

Operant conditioning, or behavior modification, represents a technology that is receiving much emphasis in the field of psychology. The operant technologist would, basically, maintain that the frequency of a behavior can be modified in accordance with the kind of reinforcement that follows the behavior. While operant technology has been widely used as a research technique by clinical and developmental psychologists, little attention has been paid to its possible value as a tool for producing, and modifying, gross motor responses. It would seem, however, to have potential for application in the areas of physical medicine and rehabilitation, particularly with mentally retarded patients.

(Author)

A72-14707 Basic kinetic rules for simple human movements. J. Wartenweiler and A. Wettstein (Eidgenössische Technische Hochschule, Zurich, Switzerland). In: Biomechanics II; Proceedings of the Second International Seminar, Eindhoven, Netherlands, August 25-29, 1969. Baltimore, Md., University Park Press, 1971, p. 134-145. 17 refs.

In this investigation a series of simple movements are graphically presented as a means of formulating basic kinetic rules of movement. These rules with certain modifications should also apply to more complex movements.

(Author)

A72-14708 Determination of muscular compliance in the course of movement. F. Goubel, S. Bouisset, and F. Lestienne (Lille, Université, Lille, France). In: Biomechanics II; Proceedings of the Second International Seminar, Eindhoven, Netherlands, August 25-29, 1969. Baltimore, Md., University Park Press, 1971, p. 154-158. 8 refs.

Description of a technique for calculating the compliance of a muscle group in the course of movements performed at variable velocities. In the proposed technique a compliance value is calculated from the inverse of the slope of the tension-length curve. It is found that compliance increases when tension decreases. The curve obtained for compliance variation as a function of tension is interpreted in terms of Hill's (1938) two-component system.

A.B.K.

A72-14709 * Self-rotation of animate beings. T. R. Kane (Stanford University, Stanford, Calif.). In: Biomechanics II; Proceedings of the Second International Seminar, Eindhoven, Netherlands, August 25-29, 1969. Baltimore, Md., University Park Press, 1971, p. 212-218. Grant No. NGR-05-020-209.

Consideration of the ability of both animals and humans to perform well-controlled self-rotation maneuvers while falling freely for short periods of time in the neighborhood of the earth's surface. Specifically, an analytical theory dealing with the righting movements of falling cats is constructed, and the validity of this theory is tested by reference to photographs. Pitch, yaw, and roll motions generated by arm and leg motions of humans are studied analytically and, in the case of yaw motions, experimentally. A.B.K.

A72-14710 **The numerical presentation of the kinematics of human body motions.** W. Gutewort (Friedrich-Schiller-Universität, Jena, East Germany). In: Biomechanics II; Proceedings of the Second International Seminar, Eindhoven, Netherlands, August 25-29, 1969. Baltimore, Md., University Park Press, 1971, p. 290-298. 8 refs.

Extension of a previously proposed method of recording human body motions by employing photogrammetric stereo cameras together with highly stabilized signal pulse transmitters. It is shown that by using pulsed-light kinegrams to obtain three-dimensional measurements of human body motions, by employing differential calculus to determine kinematic parameters, and by approximating the space-time functions of human body locomotions, it becomes possible to create mathematical models of these locomotions. A.B.K.

A72-14725 # **Experience with the camera slit lamp apparatus of VEB Carl Zeiss Jena.** A. Heydenreich (University Eye Hospital, Jena, East Germany). *Jena Review*, vol. 15, no. 5, 1971, p. 300-306. 5 refs.

The camera makes it possible to produce very good slit lamp pictures for the medical diagnosis of the eye. The device consists of a stereomicroscope and the photographic camera with a photocassette for 35 mm film. A xenon high-pressure flash light and a projection lamp are provided as light source. The principles of operation of the instrument are discussed, and a number of recommendations for its suitable use are made, giving attention to general-survey exposures, slit exposures, goniophotography, photography of the rear section of the eye, photography with horizontal slit, capillary and vascular photography, IR photography, fluorescence photography, and the photographic measuring of the anterior chamber depth. G.R.

A72-14751 **Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1 - Molecular evolution.** Conference sponsored by the Ministère de l'Éducation and the Université de Paris. Edited by R. Buvet (Paris, Université, Laboratoire d'Énergétique Electrochimique, Paris, France) and C. Ponnamperuma (NASA, Ames Research Center, Moffett Field, Calif.). Amsterdam, North-Holland Publishing Co., 1971. 557 p. \$23.50.

The present state of investigations on the origin of life is surveyed together with the current state of molecular paleontology. General and theoretical subjects discussed include an energetic approach to prebiological chemistry, the recognition of description and function in chemical reaction networks, and the origin and development of optical activity of bio-organic compounds on the primordial earth. Other fields considered are the syntheses of small molecules, oligomers and polymers; photochemical processes; the origin of biological structures; primitive biochemistry and biology; and exobiology. G.R.

A72-14752 **Problem of the origin of life - Present state and prospects.** A. I. Oparin (Akademiia Nauk SSSR, Institut Biokhimii, Moscow, USSR). In: Chemical evolution and the origin of life;

Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 3-9.

Experiments in several branches of science point in general outline to a number of stages in the evolution of carbon compounds, underlying the pathway to the origin of living things on the earth. The first stage includes an appearance of hydrocarbons, cyanides, and their close derivatives in space. In the second stage, abiogenetic synthesis of more and more complicated organic substances has proceeded in interplanetary space, and on the surface of the planets the so-called 'primeval broth' has been formed. The third stage involves the formation of the 'protobionts.' Further evolution of the 'protobionts' occurs in the fourth stage. G.R.

A72-14753 **The present state of molecular paleontology.** M. Florkin (Liège, Université, Liège, Belgium). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 10-26. 74 refs.

Florkin et al. (1961) demonstrated the preservation of shell proteins in fossils including a case involving a fossil of the Eocene with an age of 60 m.y. The persistence of the polypeptide structures during periods of up to 500 m.y. was also shown. Analyses on three different samples of fossils belonging to the order of graptoloidea were conducted by Foucart et al. (1965). Collagen has been extensively studied in fossil bones. Chitin is found in insect fossils of the Middle Eocene. Precambrian rocks dating from over 3000 m.y. have been found to contain hydrocarbons such as pristane and phytane, which are considered to be of biological origin. G.R.

A72-14757 **Energetical continuity between present-day and primeval syntheses of biological compounds.** R. Buvet, E. Etaix, F. Godin, P. Leduc, and L. Le Port (Paris, Université, Laboratoire d'Énergétique Electrochimique, Paris, France). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 51-62. 26 refs.

The major problem in connection with investigations on the origin of life is to define first how syntheses of biologically interesting compounds have come into existence, taking into consideration syntheses which on the basis of the principles of present-day biological syntheses are feasible with the only reagents available in primeval environment. A search is, therefore, conducted for the most evident conditions which govern the occurrence of syntheses as closely akin to present-day biosyntheses as possible. The discussion is entirely developed on energetical bases. The energy balances of elementary actions occurring on simplified templates of present-day biosyntheses are analyzed, giving attention to very widely represented bioreactions involving endergonic condensations in aqueous media. G.R.

A72-14758 **Unsuccessful attempts of asymmetric synthesis under the influence of optically active quartz - Some comments about the possible origin of the dissymmetry of life.** A. Amariglio and H. Amariglio (Centre de 1er Cycle, Nancy, France). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 63-70. 53 refs.

Hypotheses about the possible origin of the dissymmetry of life are proposed. Their advantage lies in the fact that they do not suppose the preexistence of any dissymmetric factor such as optically active quartz. It is shown that life itself is accountable for

the dissymmetry of living matter. The hypotheses make it possible to consider that D-amino acids, which only occur in some bacteria, should be a vestige of the early evolutionary stages of life. It is thought that chance is accountable only for the choice of the preferential configuration of the first germ. G.R.

A72-14767 * The possible participation of esters as well as amides in prebiotic polymers. A. Rich (MIT, Cambridge, Mass.). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 180-196. 13 refs. NASA-NIH-supported research.

Demonstration that alpha-hydroxy acids may have participated in the formation of prebiological polymers in a manner similar to the participation of alpha-amino acids. Experiments are described which indicate that the system for forming peptide bonds in present-day biological organisms is equally competent in forming ester and polyester bonds. In particular, the experiments described are directed toward answering questions regarding the action of peptidyl transferase in ester formation. Also, an attempt is made to determine whether a complete protein synthetic system can operate with transfer RNA molecules which have alpha-hydroxyl acids attached to them instead of alpha-amino acids, using both synthetic and natural mRNA. The ability of ribosomal peptidyl transferase to catalyze the formation of an ester bond as well as its normal product, the peptide bond, is demonstrated. A.B.K.

A72-14768 Archetypes of present-day processes of transphosphorylation, transacylation and peptide synthesis. L. Le Port, E. Etaix, F. Godin, P. Leduc, and R. Buvet (Paris, Université, Laboratoire d'Energétique Electrochimique, Paris, France). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 197-206. 23 refs.

Description of a set of experimental data related to trans-dehydration reactions of biological importance leading in particular to protein-like macromolecules, but proceeding in simple aqueous media from reagents and under conditions compatible with primeval terrestrial environment. A theoretical analysis of energy transfer processes reveals that the neutralization energies involved in trans-dehydration reactions play a role of paramount importance in the free enthalpy balances. This conclusion is supported by the experimental fact that simple esters and thioesters, relatively energy-poor as regards their simple hydrolysis in acidic media, behave as relatively energy-rich donors in alkaline solutions. M.M.

A72-14772 The origin of proteins: Heteropolypeptides from hydrogen cyanide and water. C. N. Matthews (Illinois, University, Chicago, Ill.). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 231-235. 31 refs.

Discussion of mechanistic studies which suggest a pathway of prebiotic formation of polypeptides beginning with the dimerization of hydrogen cyanide to a reactive dipolar compound - aminocyanocarbene. This compound polymerizes to form chains that interact further with hydrogen cyanide to yield heteropolypeptides that are finally converted by water to heteropeptides containing up to 15 of 20 alpha-amino acid residues commonly found in proteins. M.M.

A72-14775 * The primordial sequence, ribosomes, and the genetic code. S. W. Fox, A. Yuki, T. V. Waehndt, and J. C. Lacey, Jr. (Miami, University, Coral Gables, Fla.). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 252-262. 49 refs. Research supported by the General Foods Corp.; Grant No. NGR-10-007-008.

Experimental investigation of the key question of the origin of life concerning the chronological order in the primordial sequence of nucleic acid, protein, and cell. It is pointed out that, when viewed against the background of experiments on the selective reaction of basic homopolymers with mononucleotides (Lacey and Pruitt, 1969; Woese, 1968), the experiments made help to establish a basis for understanding how information originally flowed from proteins to nucleic acids. M.M.

A72-14778 Possible role of the acid-base equilibrium in the evolution of the mechanism regulating primary photochemical processes of photosynthesis. V. B. Evstigneev (Academy of Sciences, Institute of Photosynthesis, Moscow, USSR). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 288-296. 17 refs.

Experimental data obtained with model systems on the effects of medium acid-base equilibrium on chlorophyll photochemical reactions and photosensitizing action are shown to suggest that, following the emergence of the autotrophic mode of life based on the utilization of solar energy, the pH value may well have become a factor regulating also processes directly involved in light energy absorption and storage. It is felt that further studies will furnish more data in favor of the hypothesis that proton concentration exerts a controlling effect on primary photosynthetic reactions and possibly on the relative intensity of such competing reactions as (1) the direct electron transfer to NADP and (2) ATP formation. M.V.E.

A72-14779 Possible role of structural lipids in accumulating the energy of light. K. B. Serebrovskaia (Akademii Nauk SSSR, Institut Biokhimii, Moscow, USSR). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 297-306. 27 refs.

The possible role of lipids in accumulating the energy of light is considered on the basis of an analysis of data found in literature and on experimental work quoted. Along with the changes in its wavelength characteristics that light on earth underwent during the prebiological evolution, alterations occurred in the mechanism of lipid participation in oxidation and oxido-reduction processes. Under hard ultraviolet radiation, primary lipids could easily dehydrate. With the coming of long-wave radiation, the main role was acquired by unsaturated lipids. With the accumulation of oxygen in the atmosphere of the planet, oxygen pressure reached at last a level sufficient for starting oxidation and oxido-reduction processes in iron porphyrins. Participation of cytochromes in these processes not only intensified transmission of electrons in the light, but facilitated the creation of systems no longer dependent on light, capable of oxidizing and regenerating lipids with the help of acceptors and donors. M.V.E.

A72-14780 Evolution of the pigment system and primary processes of photosynthesis. N. V. Karapetian (Akademii Nauk SSSR, Institut Biokhimii, Moscow, USSR). In: Chemical evolution

and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 307-312. 14 refs.

The evolution of the photosynthetic apparatus is shown to have probably involved an isolation of structures which are the site of the pigment apparatus and light reactions of photosynthesis. Complication of the photosynthetic apparatus structure is likely to have increased the energetic efficiency of photosynthesis, providing closer conjugation of oxido-reductive reactions and their better coupling with formations of energy-rich compounds. It is felt that the evolution of the photosynthetic apparatus can be regarded as completed when it has acquired the capability of utilizing water and evolving oxygen. M.V.E.

A72-14781 **Participation of flavins in photobiological processes in contemporary organisms.** M. S. Kritskii (Akademiia Nauk SSSR, Institut Biokhimii, Moscow, USSR). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 313-315. 19 refs.

Discussion of some metabolic processes that are triggered by an absorption of light quanta by photoreceptors. It is suggested that, at a certain stage of the evolution of the earth's atmosphere, photobiological processes - such as flavin-photocatalyzed reactions with absorption maxima at the shorter end of the visible light range - could have become very important. M.V.E.

A72-14782 **The problem of chance in formation of proto-bionts by random aggregation of macromolecules.** R. W. Kaplan (Frankfurt, Universität, Frankfurt am Main, West Germany). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 319-329. 21 refs.

Consideration of the random processes that may have played a role in biogenesis: (1) in producing the right pattern of proteins and nucleic acids, and (2) in constructing the apparatus of reproduction from a series of proteins and nucleic acids with the right patterns. The probabilities of functional proteins and those for a nucleic acid to be a gene for a protein are discussed, and an attempt is made to estimate the orders of magnitude of the chances for the formation of protobionts. A sequence of possible steps is reviewed that may explain the evolution of eobionts in the direction of familiar cells. M.V.E.

A72-14783 **A study on interrelation of model structures with biochemical processes occurring in these structures.** N. V. Vasil'eva (Akademiia Nauk SSSR, Institut Biokhimii, Moscow, USSR). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 330-336. 5 refs.

Two nucleoprotein coacervate model systems are analyzed wherein the hydrolysis and synthesis lead to the formation of new properties which can be regarded as specific functions of these systems. In the investigation, ribonuclease and polynucleotide phosphorylase are used as enzymes. M.V.E.

A72-14784 **Oxidoreductases and the stability of coacervate drops.** T. N. Evreinova, T. V. Mamontova, V. A. Karnaukhov, and A. N. Dudaev (Moskovskii Gosudarstvennyi Universitet; Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). In: Chemical

evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 337-344. 8 refs.

The composition is considered of coacervate systems in terms of distribution of coacervate drops, polyphenol oxidase-carbohydrate-histone-quinones, and of the diameter, volume, and weight of individual coacervate drops. It is shown that photomolecules (protoproteins, protonucleic acid, etc.) may have been present in primitive prebiological systems (coacervate and other systems) many billion years ago. It is felt that the differing stability of coacervate drops is of interest from the point of view of selection of drops best suited for evolution. M.V.E.

A72-14785 **Possible participation of pigments in formation of simplest structures.** G. A. Korneeva (Akademiia Nauk SSSR, Institut Biokhimii, Moscow, USSR). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 345-351. 13 refs.

Lipid systems are studied both before and during coacervation, and the structure forming action of pigments in diluted aqueous solutions of surface-active agents is examined. Two particular problems are considered: (1) whether chlorophyll exhibits photochemical activity in surface-active agents, and (2) what the effect is of the type of structure of a surface-active agent on the photochemical activity of the pigment. M.V.E.

A72-14786 **A possible pathway of biological membrane evolution.** D. N. Ostrovskii (Akademiia Nauk SSSR, Institut Biokhimii, Moscow, USSR). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 352-354. 13 refs.

The problem of molecular organization of biological membranes is considered in the light of some implications based on bacterial membrane biochemistry and a few selected facts from other fields of membranology. A biological membrane is thought to develop from a biomolecular lipid film to an assembly of lipoprotein particles with a partial 'survival' of the lipid as a phase. M.V.E.

A72-14787 * **The properties of an ion selective enzymatic asymmetric synthetic membrane.** M. A. Mitz (NASA, Office of Space Science and Applications, Washington, D.C.). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 355-362. 6 refs.

With the aid of a simple model membrane system, the properties of cellulose enzymes and of membrane selectivity and pump-like action are considered. The model is based on materials possibly present on a primitive earth, as well as on a membrane able to sort or concentrate these materials. An overview of the model membrane system is presented in terms of how it is constructed, what its properties are, and what to expect in performance characteristics. The model system is shown to be useful for studying the selective and in some cases accelerated transfer of nutrients and metabolites. M.V.E.

A72-14788 **A model of selective accumulation of carbohydrates diffusing through artificial polymer membranes.** L. N. Moiseeva (Akademiia Nauk SSSR, Institut Biokhimii, Moscow,

USSR). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 363-368. 6 refs.

A model is considered that makes it possible to explain the accumulation of carbohydrate substances, during their conversion into ionic forms in life generating processes, by the electrostatic interaction of these substances with membrane surface charges. Properties relating prebiological systems to open catalytic microsystems are discussed. M.V.E.

A72-14789 **Excitability, polyphosphates and precellular organization.** N. W. Gabel (Illinois State Psychiatric Institute, Chicago, Ill.). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 369-378. 16 refs.

A review is presented of the recent investigations initiated in an effort to obtain substantive evidence for a hypothesis which related the excitability phenomenon of neural tissues to the concept of precellular organization. Specifically, the distribution of polyphosphate material in vertebrate tissues is considered. Characteristic properties of polyphosphates are outlined, and the evidence of their occurrence in a large number of microorganisms and, in particular, mammalian tissues is discussed. It is shown that polyphosphates are apparently ubiquitous to living matter, and that the possibility exists that they were ubiquitous before recognizable life forms emerged. O.H.

A72-14790 **Gramicidin S and tyrocidine biosynthesis - A primitive process of sequential addition of amino acids on polyezymes.** F. Lipmann (Rockefeller University, New York, N.Y.). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 381-391. 13 refs.

The primitive process of antibiotic polypeptide synthesis is studied by the example of gramicidin S and tyrocidine. It is shown that, in terms of process evolution, the antibiotic synthesis is closely related to the multienzyme fatty acid synthesis, where the growing fatty acid chain remains enzyme-linked through thioester bonds. A next step in the evolution toward protein synthesis is antibiotic polypeptide synthesis, a much more compact procedure than ribosome-linked protein synthesis with only enzymes, ATP, and amino acids as ingredients. A primitive model is thus obtained for a process of sequential addition of amino acids to form functionally defined polypeptides. O.H.

A72-14791 * **Evolution of proteins.** M. O. Dayhoff (National Biomedical Research Foundation, Silver Spring, Md.). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 392-419. 21 refs. NASA-supported research; NIH Grant No. GM-08710.

The amino acid sequences of proteins from living organisms are dealt with. The structure of proteins is first discussed; the variation in this structure from one biological group to another is illustrated by the first halves of the sequences of cytochrome c, and a phylogenetic tree is derived from the cytochrome c data. The relative geological times associated with the events of this tree are discussed. Errors which occur in the duplication of cells during the evolutionary process are examined. Particular attention is given to evolution of mutant proteins, globins, ferredoxin, and transfer ribonucleic acids (tRNA's). Finally, a general outline of biological evolution is presented. O.H.

A72-14792 **DNA - Origin, evolution and variability.** A. S. Antonov (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 420-424. 8 refs.

Some problems associated with DNA are examined. First, the possibility of an estimation of the 'age' of DNA as genetic material is considered based on the available data on the degree of variability of the DNA primary structures in the species belonging to various taxons. The evolution pattern of the primary DNA structures is then investigated. Finally, the feasibility of application of the data on the variability degree of the DNA primary structures to determine the formal scale of taxons in the existing systems of animals, plants, and microorganisms is discussed. O.H.

A72-14793 **The origin of ribosomes and the evolution of rRNA.** B. M. Mednikov (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 425-431. 11 refs.

Processes occurring in the third stage of biogenesis - i.e., the evolutionary phase from the coacervate to the protocell - are studied. In particular, the problem of what were the early stages of protein synthesis, and the primary ribosomes and their nucleic acids, is examined. It is suggested that in the course of evolution of ribosomal RNA, the problem of protein biosynthesis has taken different, sometimes opposite routes, and these routes have often changed. O.H.

A72-14794 **The genetic code and the origin of life.** P. Gavaudan. In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 432-445. 17 refs.

Some observations on the numerical structures of the genetic code as they have been experimentally established are studied. The problem is examined whether the structure of the genetic code as a whole does not conform to some optimization rule so that conclusions relevant to the problem of the origin of life may be ultimately drawn from the observed regularities. It is shown that the genetic code is constructed in accordance with a hierarchy of structures, all associated in harmonized succession to some rule of optimization relative to a logarithmic criterion. When speculating on the origin of the genetic code, it is therefore not possible to disregard the numerical optimization linked to its hierarchy of structures. O.H.

A72-14795 **The origins of bacterial respiration.** E. Broda (Wien, Universität, Vienna, Austria). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 446-452. 18 refs.

Various hypotheses concerning the primordial background of the generation of metabolic energy through oxidative phosphorylation in bacteria are considered. The following hypotheses are noted: photosynthesis preceded sulfate respiration when the atmosphere was still anoxygenic; thiobacilli evolved from colored sulfur bacteria after the formation of an oxygenic environment; pure aerobes evolved from facultative anaerobes and aerobes in the oxygenic atmosphere. A diagram of the evolution of bacterial respiration on the earth is given. V.Z.

A72-14796 **Change of biochemical functions of organisms in the evolution of the biosphere.** E. A. Boichenko (Akademiia Nauk SSSR, Institut Geokhimii i Analiticheskoi Khimii, Moscow, USSR). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 453-457. 15 refs.

Papers relating to the evolution of biochemical processes in the biosphere are reviewed. Covered are redox reactions during the Archean, Proterozoic, Paleozoic, Mesozoic and Cenozoic eras, the elementary composition of organisms in the biosphere, and the participation of metal compounds in the evolution of photosynthesis. V.Z.

A72-14797 **Inorganic polyphosphates in evolution of phosphorus metabolism.** I. S. Kulaev (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 458-465. 21 refs.

The possible effect of inorganic polyphosphates on the development of phosphorus metabolism in living organisms is examined. The structure of polyphosphates is briefly discussed. Two possible schemes are considered: one of a glycolysis-dependent reaction involving the participation of polyphosphate synthetase isolated from *N. crassa*, the other of a reaction involving polyphosphate hexokinase, isolated from mycobacteria. The distribution of polyphosphate glucokinase in different microorganisms is presented. It is suggested that in primary living organisms high polymer inorganic polyphosphates could have played the role ATP has in contemporary organisms. O.H.

A72-14798 **Inorganic pyrophosphate and the origin and evolution of biological energy transformation.** H. Baltscheffsky (Stockholm, Universitet, Stockholm, Sweden). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 466-474. 30 refs. Research supported by the Statens Naturvetenskapliga Forskningsråd, the Charles F. Kettering Foundation, and the Sigrid Juselius Stiftelse.

Two questions are considered that are concerned with prebiological and early biological energy transformation: the first is, what mechanisms of energy transformation existed at the time when chemical (prebiological) systems evolved into biochemical systems; the second is, what was the nature of the energy-rich compounds involved in mobilization of free energy for reproduction and other energy-requiring reactions of the earliest living systems. The features of inorganic pyrophosphate (PPi) and its reactions in chromatophores are discussed. It is suggested that inorganic phosphates preceded adenosine phosphates as energy carriers in both substrate level and electron transport level phosphorylation systems, and that convergence may have occurred also at the chemical stage in the evolution of energy transformation. O.H.

A72-14799 **Some information on the possibility of preglycolytic ways in evolution.** E. Pantskhava (Akademiia Nauk SSSR, Institut Biokhimii, Moscow, USSR). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 475-479. 10 refs.

Demonstration that the classical form of glycolysis, having passed through the long evolutionary period from primitive

anaerobic organisms to higher organisms, could not be the primary and only form of energy exchange. Glycolysis is the result of a long biochemical evolution. It could have been preceded by more simple types of energy metabolism not requiring preliminary phosphorylation of the substrate at the cost of ATP - e.g., anaerobic oxidation of pyruvate and acetaldehyde into acetate and ATP. F.R.L.

A72-14800 **Microbial evolution on the early earth.** L. Margulis (Boston University, Boston, Mass.). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 480-484. 18 refs.

Development of a model for the evolutionary relationship between Early Precambrian prokaryotic cells and Late Precambrian eukaryotic cells. The model is explicit and testable on many grounds. Implied in the model is the concept that hereditary endosymbiosis has been a significant evolutionary mechanism in the origin of the eukaryotic cell. The model theorizes that the eukaryotic cell is a product of temporally ordered, specific symbioses. F.R.L.

A72-14801 **Life in extreme environments.** D. J. Kushner (Ottawa, University, Ottawa, Canada). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 485-491. 25 refs.

Study of contemporary organisms that show that life can exist under more extreme conditions than are normally thought possible. Several microorganisms can live at high temperatures, near the boiling point of water, and some require high temperatures for growth. Quite low or high external pH values are consistent with life, and many organisms can live in high concentrations of salt or sugar. Some of the effects of salt on enzyme activity and configuration are illustrated. F.R.L.

A72-14802 **Organic substances in the universe.** V. G. Fesenkov (Akademiia Nauk SSSR, Komitet po Meteoritam, Moscow, USSR). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 495-498.

Discussion of the proposition that mutual comet collisions in planetary nebulae were a valuable source of organic compounds in the preplanetary era. Carbonaceous meteorites, allegedly originating from comets, show evidence of plentiful fairly complex organic compounds including some of the nucleic acid bases. Detailed experiments have shown that these types of organic compounds can be reproduced in reactions, approaching thermodynamic equilibrium of meteoritic material and other elements, through heating to a few hundred C followed by a cooling for a few hours or at most a few days. These conditions are similar to those which could have been achieved when the planets in the solar system were formed through comet clashes followed by temporary overheatings. It is considered that a more comprehensive study of comets will make it possible to get more useful data to solve the problem of the occurrence of life within space and, more particularly, on the earth. F.R.L.

A72-14803 **Carbonaceous chondrites and the prebiological origin of food.** P. C. Sylvester-Bradley (Leicester, University, Leicester, England). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amster-

dam, North-Holland Publishing Co., 1971, p. 499-504. 26 refs.

Examination of the conditions under which compounds immiscible in water are likely to have arisen in carbonaceous chondrites, with an estimate of how far such conditions could have been duplicated during the early history of the earth. Prebiological food appears to have been a product of chemical evolution. The hypothesis developed is that the carbonaceous chondrites have frozen in them an early differentiate of planetary evolution, a stage which will have been developed on all terrestrial planets. Environmental evidence is presented, organic synthesis is discussed, and terrestrial analogs are outlined. F.R.L.

A72-14805 * The planets and life. R. S. Young (NASA, Washington, D.C.). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 510-515.

It is pointed out that planetary exploration is not simply a program designed to detect life on another planet. A planet similar to earth, such as Mars, when studied for evidence as to why life did not arise, may turn out to be scientifically more important than a planet which has already produced a living system. Of particular interest after Mars are Venus and Jupiter. Jupiter has a primitive atmosphere which may well be synthesizing organic molecules today. Speculations have been made concerning the possibility of a bio-zone in the upper atmosphere of Venus. G.R.

A72-14806 Extraterrestrial-life study - Problem of its origin and evolution. V. A. Otratchenko and L. M. Mukhin (Akademii Nauk SSSR, Institut Kosmicheskikh Issledovani, Moscow, USSR). In: Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-à-Mousson, France, April 19-25, 1970. Volume 1. Amsterdam, North-Holland Publishing Co., 1971, p. 516-522. 15 refs.

Investigation and consideration of all circumstances and possibilities under which the evolution of organic matter beyond the earth occurred or, on the contrary, was stopped. These may be decisive factors in the correct understanding of the problems of the origin of life. An attempt is made to estimate the possibility of existence on the near-earth planet Mars, Venus, and Jupiter of the living systems or molecules which are the precursors of complex organic compounds. It appears that Mars is the only planet besides the earth where the existence of living systems appears to be likely. F.R.L.

A72-14850 # A matter of interpretation. J. M. Rolfe (RAF, Institute of Aviation Medicine, Farnborough, Hants., England). *Aviation Review*, Nov. 1971, p. 12-15.

Consideration of ambiguities of communication that can occur between man and machine, a classical example of this in aviation being the three-pointer altimeter. Research into human behavior has demonstrated three major factors which give rise to the misinterpretation of information: inadequate or ambiguous information gathered by the sense organs; inadequate previous experience of the information being presented; and the expectation on the part of the receiver of getting a different message from that actually sent. Delays occurring when dealing with information; distortion of the information as it is transmitted; and loss of information in transmission are discussed. F.R.L.

A72-14861 Antibody response of normal and germ free rats to injected sheep erythrocytes when held in a helium-oxygen atmosphere. J. P. Doll and M. Pollard (Notre Dame, University, Notre Dame, Ind.). *Aerospace Medicine*, vol. 42, Dec. 1971, p.

1266-1269. 19 refs. Contract No. Nonr-1623/15/.

Groups of conventional and germfree (GF) Sprague-Dawley rats were held in a Reyniers' type germfree isolator in an atmosphere of 20% oxygen and 80% helium. The animals were allowed to accommodate to the esoteric environment for five days and were then inoculated IP with 1 cc of 20% sheep RBC. Five days after inoculation the rats were killed, serum harvested, and microagglutinin and hemolysin titres determined. Compared to controls, conventional rats in the oxygen-helium atmosphere showed very significantly lower antibody titres. But conventional rats held in the same isolators under normal atmospheric gaseous conditions also showed reduced agglutinin and hemolysin titres. However, GF animals under the esoteric atmospheric conditions did not show reduced titres. No significant morphological differences were found between the two groups, so it is possible that a stress phenomenon due to certain aspects of the isolator environment such as noise, altered diurnal rhythm, vibration or mere confinement may directly or indirectly be responsible for the altered antibody response.

(Author)

A72-14862 Relationship between the time constants of RC networks and nitrogen washout in the respiratory system. S. T. Chiang (National Defense Medical Center; Taiwan Veterans' General Hospital, Taipei, Nationalist China). *Aerospace Medicine*, vol. 42, Dec. 1971, p. 1270-1274. 19 refs.

The theoretical relationship between the time constant of pulmonary RC network and the time constant of pulmonary nitrogen washout have been mathematically analyzed. Experimental data obtained from multiple breath end-tidal nitrogen washout and resistance and compliance determinations in fourteen subjects showed a good correlation between these. The greater the ventilatory efficiency of the lung as demonstrated by nitrogen washout, the shorter the time constant of the RC network. This study demonstrated that multiple breath nitrogen washout could be offered as second method to measure mechanics of breathing. It also directly proved that rapidity of nitrogen washout is closely related to pulmonary resistance and lung compliance. (Author)

A72-14863 Influence of oxygen and carbon monoxide concentrations on blood carboxyhemoglobin saturation. F. L. Rodkey, H. A. Collison, and J. D. O'Neal (National Naval Medical Center, Naval Medical Research Institute, Bethesda, Md.). (Joint Committee on Aviation Pathology, Toxicology Colloquium, Oklahoma City, Okla., Oct. 12-15, 1970.) *Aerospace Medicine*, vol. 42, Dec. 1971, p. 1274-1278. 20 refs. Navy Task M4306,02-4030B.

Blood carboxyhemoglobin has been measured in man and related to existing concentrations of oxygen and carbon monoxide in inspired air. An equation is presented to estimate the equilibrium COHb levels when the inspired air composition is known. A subject on a small closed rebreathing system at atmospheric pressure achieves equilibrium between O₂, CO, and Hb in about 15 minutes. The CO in the gas phase and the blood COHb remain in essential equilibrium, increasing only as a result of endogenous CO production and accumulation. Subjects in a closed system at elevated (19 atmospheres absolute) or decreased (10 psia) pressure excrete endogenously formed CO into the restricted atmosphere leading to increases in the blood COHb and in the CO concentration in the habitat gas.

(Author)

A72-14864 * Further studies on the dimensionless parameters associated with the 'in vivo' transport of heat within biological tissue. A. Shitzer and J. C. Chato (Illinois, University, Urbana, Ill.). *Aerospace Medicine*, vol. 42, Dec. 1971, p. 1279-1283. 16 refs. Research supported by the Hebrew Technical Institute; Grant No. NGR-14-005-103.

It is pointed out that planetary exploration is not simply a program designed to detect life on another planet. A planet similar to earth, such as Mars, when studied for evidence as to why life did not arise, may turn out to be scientifically more important than a planet which has already produced a living system. Of particular interest after Mars are Venus and Jupiter. Jupiter has a primitive atmosphere which may well be synthesizing organic molecules today. Speculations have been made concerning the possibility of a bio-zone in the

A72-14865 * Gyroscopic stimulation of the semicircular canals during sensory deprivation. B. D. Newsom, J. F. Brady, and J. E. Stumm (NASA, Manned Spacecraft Center, Houston, Tex.; General Dynamics Corp., Convair Div., San Diego, Calif.). *Aerospace Medicine*, vol. 42, Dec. 1971, p. 1283-1289. 16 refs. Contract No. NAS1-7309.

A static object revolving at a constant velocity is stationary with respect to that environment. When the object is rotated outside the plane of spin, a gyroscopic or cross-coupled acceleration is produced orthogonal to the two planes of rotation. In this situation, a man feels himself moving in a direction other than that which his visual or proprioceptive sensors perceive. The conflict in spatial orientation is the cross-coupled acceleration imposed on the semicircular canals. This perceptual conflict and the thresholds involved were studied by partial occlusion of the physiological stimuli through sensory deprivation. Subjects weighted to neutral buoyancy were submerged in 94 F water in the dark. The subjects were then rotated while being revolved about a displaced axis. Thresholds for detection of angular acceleration were higher than those reported in the literature for detection of acceleration of a single plane. This discrepancy may be attributable to the length of time the stimuli are imposed to each of the canals and the cupular response periods. (Author)

A72-14866 * # Effect of altered 'weight' upon animal tolerance to restraint. R. R. Burton, A. H. Smith, and J. R. Beljan (California, University, Davis, Calif.). *Aerospace Medicine*, vol. 42, Dec. 1971, p. 1290-1293. 10 refs. Grant No. NGR-05-004-008; Contract No. NAS2-5245.

The effect of altered weight upon animal tolerance to restraint was determined by simulating various acceleration forces with directed lead weights using restrained and nonrestrained domestic fowl (chickens). Weighting (increased weight) and counterweighting (reduced weight) produced a stressed condition - reduced relative lymphocyte counts, loss of body mass, and/or the development of a disorientation syndrome - in both restrained and nonrestrained (caged only) birds. The animal's tolerance to altered weight appeared to be a function of its body weight. Unrestrained birds were stressed by counterweighting (mean plus or minus standard error) 58.3 plus or minus 41% of their body weight, whereas restrained birds tolerated only 32.2 plus or minus 2.6% reduction in body weight. A training regimen for restrained birds was not effective in improving their tolerance to a reduced weight environment. It was concluded that domestic fowl living in a weightless (space) environment should be restrained minimally and supported by ventrally directed tension equivalent to approximately 50% of their body mass (their weight in a 1 G environment). (Author)

A72-14867 * Effect of circadian rhythm on CNS oxygen toxicity. D. G. Hof, J. D. Dexter, and C. E. Meigel (Missouri, University, Columbia, Mo.). *Aerospace Medicine*, vol. 42, Dec. 1971, p. 1293-1296. 18 refs. NIH Grant No. CA-11447; Contracts No. NAS9-9209; No. NAS9-9417; No. N00014-67-A-0003.

The circadian rhythm in susceptibility to oxygen toxicity seizures was investigated by using six groups of 20 male Sprague-Dawley rats (101-196 gm.). The animals were given standard chow, exposed to standard diurnal conditions of light (0700-1900 hr) and

dark (1900-0700 hr), and fasted for 15-16 hr prior to exposure to hyperbaric oxygen. The animals were placed in a previously oxygen flushed chamber and raised to 60 psi (gauge) oxygen at a rate of 3 psi/min. Time of exposure started with attainment of 60 psi. End point was first convulsion. The animals' weights were equally distributed within the groups, and the groups were defined by hour of exposure. Time of exposure in minutes prior to seizure was significantly longer in those exposed at 0700-0800 hr and 1000-1100 hr than in four other groups. There was no relationship between animals' weights and time of exposure to seizures. All R values were negative, and the highest R value was -.035. These data suggest a definite circadian rhythm in susceptibility to oxygen toxicity seizures. (Author)

A72-14868 Effect of endurance training on the urinary excretion of noradrenaline and adrenaline during ground and flying activity. P. J. Sarviharju, M. E. Huikk, P. I. Jouppila (Jyväskylä, Yliopisto, Jyväskylä, Finland), and N. T. Kaerki (Oulu, Yliopisto, Oulu, Finland). *Aerospace Medicine*, vol. 42, Dec. 1971, p. 1297-1302. 36 refs. Research supported by the Finnish Air Force.

The urinary excretion of noradrenaline and adrenaline of 18 young healthy pilots was measured under conditions of ground activity and flight as a pilot before and after a three-months' period of progressive endurance training. An increased excretion of adrenaline was found in waiting for the flight and that of noradrenaline and adrenaline during the flight as compared to the situation of ground activity. Some adaptation was noticed in the excretion of adrenaline but not of noradrenaline. During flight the ratio of NA/A was significantly smaller than in waiting for the flight before the training period but not after it. (Author)

A72-14869 Human factors in relation to the development of pressurized cabins (The Harry G. Armstrong Lecture). R. A. McFarland (Harvard University, Boston, Mass.). (*Aerospace Medical Association, Annual Meeting, 42nd, Houston, Tex., Apr. 26-29, 1971.*) *Aerospace Medicine*, vol. 42, Dec. 1971, p. 1303-1318. 38 refs.

The development of pressurized cabins has been one of the most important factors relating to the comfort, reliability and safety of modern air transportation. A brief history is given of the problems encountered in the early balloon ascents, as well as during the early days of aviation and in the initial attempts at pressurized flight. Findings relating to the effects of high altitude and changes in barometric pressure are then highlighted from experiments carried out at high terrestrial altitudes, during aircraft flight, and in laboratory studies at simulated altitudes. The implications are considered in relation to predicting the effects of loss of pressure, and for selecting the most desirable cabin altitudes for air transports. In conclusion, the operating experience in military and civilian pressurized aircraft is reviewed, with special attention given to an analysis of loss of pressure incidents. In general, the number of rapid decompressions has been less than anticipated. (Author)

A72-14870 Risk of in-flight incapacitation of airline pilots. J. C. Lane (Department of Civil Aviation, Melbourne, Australia). *Aerospace Medicine*, vol. 42, Dec. 1971, p. 1319-1321. 7 refs.

Data on the incidence of in-flight incapacitation of pilots have recently become available from three sources: reports by airlines, a study of career termination of pilots from medical causes and responses to a questionnaire addressed to pilots. Three corresponding estimates are derived of the incidence of in-flight incapacitating events with the flight stage as the measure of exposure. These estimates are compared with similar event probabilities used for

airworthiness requirements. It is concluded that the observed incapacity probability represents an acceptable share of the total system incident probability and that there is no case for making the general medical standards for airline pilots more demanding. Improved predictors of ischaemic heart disease are, however, desirable. (Author)

A72-14871 **Immobilization hypercalciuria - Treatment and a possible pathophysiologic mechanism.** D. P. Griffith (U.S. Veterans Administration Hospital; Baylor University, Houston, Tex.). *Aerospace Medicine*, vol. 42, Dec. 1971, p. 1322-1324. 11 refs.

Calcium excretion has been reduced by 30%-60% in seven chronically recumbent patients by depletion of extracellular volume. Extracellular volume depletion was achieved by use of a 1.0 gm NaCl diet and a thiazide diuretic. It is postulated that the intercompartmental shift of fluids and electrolytes during chronic recumbency could contribute to the syndrome of recumbent hypercalciuria and recumbent osteoporosis. (Author)

A72-14872 **Safety of INH chemoprophylaxis in aviation personnel.** C. Shub, P. C. Salmonsens, J. E. Jordan, M. A. Hofmann, and B. B. Alexander (U.S. Lyster Army Hospital; U.S. Army, Aviation School; U.S. Army, Aeromedical Research Laboratory, Fort Rucker, Ala.). *Aerospace Medicine*, vol. 42, Dec. 1971, p. 1325-1335. 53 refs.

INH was administered to a group of tuberculin positive, healthy aviators for one year while multiple physiological parameters were monitored. The aviators were allowed to continue their flying duties while taking the drug. There was no evidence of severe drug reactions. There was a high incidence of various, mild, transient, complaints but these were interpreted as minimal drug intolerance rather than actual toxic or adverse reaction. INH therapy was discontinued in only 2 of 58 subjects: one because of persistent arthralgias, the other because of steadily increasing transaminases and hepatomegaly. The abnormalities in both subjects abated after cessation of therapy. The search for subclinical toxicity uncovered several borderline changes whose significance is not known at the present time. It is recommended that aviators be allowed to continue flying duties while taking INH, but in the interest of aviation safety, a regular program of careful clinical observation and periodic measurements of transaminase levels seems warranted. (Author)

A72-14873 **Technique for optimal fitting of flight helmets.** J. W. Greene (U.S. Naval Aerospace Medical Center, Aerospace Medical Research Laboratory, Pensacola, Fla.). *Aerospace Medicine*, vol. 42, Dec. 1971, p. 1338-1340. Navy-supported research.

Although aviators' flight helmets may possess exceptionally good noise attenuation qualities, maximum attenuation may not always be realized when the helmet is worn, particularly if the helmet does not fit well. The lack of a standardized procedure for fitting flight helmets often results in a poor compromise that sacrifices noise exclusion for comfort. A procedure that involves the use of a noise source and an automatic recording audiometer has been developed as an aid in the fitting process. The noise source allows the aviator to detect acoustical leakage around his ears so that a better fit can be effected. Masked hearing threshold levels obtained with the helmet's earphones can be used to demonstrate improved performance. (Author)

A72-14895 **The effects of exercise training and denervation on the morphology of intrafusal muscle fibers.** C. M. Tipton (Iowa, University, Iowa City, Iowa) and J. A. Maynard. *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 30, no. 1, 1971, p. 1-9. 17 refs. Research supported by the University of Iowa.

The morphological effects of daily bouts of exercise and denervation on teres minor intrafusal muscle fibers were investigated in male Sprague-Dawley rats. After denervation, nuclear bag and nuclear chain muscle fiber cross-sectional area atrophied only 25 and 33% of the amount experienced by extrafusal fibers. Of the two fiber types, the nuclear chain fibers appeared to be more responsive to the effects of exercise than the nuclear bag fibers; however, this trend for enlargement had no statistical significance. Length measurements did not reveal any marked changes of any fiber type to the experimental conditions of this study. It was concluded that the possible differences in function and innervation of the nuclear bag and nuclear chain fibers could partly account for these findings. (Author)

A72-14896 **Body temperature in exercise - Effects of acclimatization to heat and habituation to work.** C. T. M. Davies, C. Barnes, and A. J. Sargeant (London School of Hygiene and Tropical Medicine, London, England). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 30, no. 1, 1971, p. 10-19. 17 refs.

The problem of thermoregulation in body exercise was examined in two healthy subjects, an athlete and a nonathlete. The tympanic temperature, sweat rate, and oxygen intakes during the exercise were measured. The interpretation of the results suggests that the training of man's thermoregulatory and maximum aerobic power mechanisms are not necessarily interdependent, and that the rise in the tympanic temperature is due to the proportional nature of central nervous control mechanisms and ability of the body to dissipate rather than to produce heat. O.H.

A72-14897 **Exercise-induced changes in serum enzyme activities and their relationship to maximum oxygen uptake.** P. L. Schwartz, H. W. Carroll, and J. S. Douglas, Jr. (U.S. Navy, Naval Field Research Laboratory, Camp Lejeune, N.C.). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 30, no. 1, 1971, p. 20-33. 33 refs.

An investigation was undertaken in order to determine whether maximum aerobic power can be predicted from changes in serum activities in response to a constant test exercise. Activities of creatine phosphokinase (CPK), lactate dehydrogenase (LDH), malate dehydrogenase (MDH), and glutamate-pyruvate transaminase (GPT) were measured before and immediately after exercise, and correlation coefficients relating these changes with maximum oxygen uptake were calculated. O.H.

A72-14898 **Muscular exercise, 2,3-DPG and oxy-hemoglobin affinity.** J. A. Dempsey, J. Rodriguez, N. T. Shahidi, W. G. Reddan, and J. D. MacDougall (Wisconsin, University, Madison, Wis.). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 30, no. 1, 1971, p. 34-39. 14 refs. Research supported by the Wisconsin Heart Association.

An investigation has been undertaken of the effects of prolonged muscular work in healthy subjects on erythrocyte 2,3-diphosphoglycerate as a mediator of acute changes in the affinity of hemoglobin for oxygen. Results are consistent with the contention that time is a critical determinant of any contribution the generation of erythrocyte 2,3-DPG may make to oxy-hemoglobin affinity, regardless of the apparent intensity of demand for increased oxygen delivery. O.H.

A72-14899 **Assessment of arrhythmia of heart rate during physical work (Ermittlung der Pulsfrequenzarrhythmie bei körperlicher Arbeit).** W. Laurig, H. Luczak, and U. Philipp (Darmstadt, Technische Hochschule, Darmstadt, West Germany). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 30, no. 1, 1971, p. 40-51. 17 refs. In German. Research supported by the Stiftung Volkswagenwerk.

The relation between arrhythmia of heart rate and work load has been investigated in several male subjects. It is concluded that, due to the nonnormal distribution of the single heart rate values, simple statistic measures of variation are not suitable for the description of arrhythmia. A measure for arrhythmia has to take into account variations of heart rate in both amplitude and frequency. The derived 'quotient of arrhythmia' is found to decrease with work load and also with heart rate. A stochastic part of the quotient has been derived by extrapolation. O.H.

A72-14900 **Effects of physical conditioning upon the central and peripheral circulatory responses to arm work.** R. Simmons and R. J. Shephard (Toronto, University, Toronto, Canada). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 30, no. 1, 1971, p. 73-84. 30 refs. Research supported by the Ontario Heart Foundation.

Results of a test program in which ten sedentary young men completed four weeks of endurance training involving biweekly 30-min sessions of exercise on an arm ergometer at 80% of maximum aerobic power. Maximum oxygen intake increased by 8%, and there was also a 4% increase in the mechanical efficiency of effort. The cardiac output (measured by acetylene rebreathing) increased in both submaximum and maximum effort. There was an 8% increase in maximum stroke volume, but no change of maximum heart rate. Strain gauge measurements showed a diversion of blood flow from skin to muscle with training. This adaptation is of value to the athlete only after alternative methods of heat dissipation have developed. The possible application of the arm ergometer to the training of patients with leg injuries is briefly discussed. (Author)

A72-14916 **Ecogenesis of the island of Surtsey 1968 to 1970 (Ökogenese der Insel Surtsey 1968 bis 1970).** G. H. Schwabe (Max-Planck-Institut für Limnologie, Plön, West Germany) and K. Behre. *Naturwissenschaftliche Rundschau*, vol. 24, Dec. 1971, p. 513-519. 7 refs. In German. Research supported by the Deutsche Forschungsgemeinschaft and the Surtsey-Forschungsgesellschaft.

Aspects of ecogenesis regarding an island which owes its origin to volcanic eruptions or which is completely covered with lava during a volcanic eruption are discussed, giving attention to processes and developments taking place on the island of Surtsey after the last lava eruption in 1967. Two biomes can be distinguished in the ecogenesis concerning such an island including the marine littoral and sublittoral on one hand, and the island surface as terrestrial domain on the other. In both biomes cryptogams are characteristic for the early stages of ecogenesis. Differences between the two biomes are considered together with the appearance of the various biotic species, giving particular attention to different types of algae. G.R.

A72-15100 # **ALSEP human-engineering design criteria.** R. L. Redick (Bendix Corp., Aerospace Systems Div., Ann Arbor, Mich.). *Bendix Technical Journal*, vol. 4, Summer-Autumn 1971, p. 94-99. 6 refs.

The development of human-engineering design criteria for crew operations was one of the most challenging aspects of preparing for manned lunar surface exploration. This paper details some of the human-engineering guidelines that were developed for crew interface with the Apollo Lunar Surface Experiments Package (ALSEP). It traces in particular the development of the versatile universal

handling tool, and describes briefly the crew-engineering mock-up used for human-factors evaluation and the astronaut trainer used for crew training. (Author)

A72-15124 **Studies on the distensibility characteristics of capacitance and resistance vessels of the isolated rabbit ear.** L. Lange, M. Echt, K. Kirsch, and H. L. Thron (Berlin, Freie Universität, Berlin, West Germany). *Pflügers Archiv*, vol. 330, no. 2, 1971, p. 111-123. 19 refs. Contract No. F61052-68-C-0069.

Using a plethysmographic technique, the distensibility characteristics of capacitance and resistance vessels at varying basal tone were determined simultaneously in the rabbit's ear, which represents a uniform vascular bed of skin vessels. The pressure-volume curves of the capacitance vessels showed hysteresis loops. The hysteresis became greater at increasing venous tone. Stress-relaxation occurred with repeated congestion and could be demonstrated by the pressure-volume curves. At high venous tone stress-relaxation could be shown also by a decrease of the venous pressure-gradient indicating an increase of the venous cross section area. The distensibility characteristics of the resistance vessels resembled those of the capacitance vessels showing the same dependency on basal tone. However, stress-relaxation could not be demonstrated in these vessels. (Author)

A72-15125 **Spinal mesenteric vascular reflexes - A contribution to the problem of the nutritional hepatic reflex of H. Rein (Über spinale mesenterio-mesenteriale Gefässreflexe - Ein Beitrag zur Frage des nutritiven Hepaticareflexes von H. Rein).** E. Bauereisen, H. Henrich, J. Lutz, and U. Peiper (Würzburg, Universität, Würzburg, West Germany). *Pflügers Archiv*, vol. 330, no. 2, 1971, p. 124-135. 16 refs. In German.

Experiments in animals were carried out in which the vascular beds of the coeliac, upper mesenteric, and splenic arteries were hemodynamically isolated and perfused with a constant volume of the animals' own blood drawn from the abdominal aorta. In each of the separately perfused vascular areas pressure changes could be produced by leading the perfusate directly into the distal aorta. Results show that pressure drop in the coeliac artery causes marked vasoconstriction in the upper mesenteric artery and vice versa; the area of reflex responses is not restricted to the intestinal vessels, but seems to extend over the entire abdominal splanchnic circulation; pressure lowering in the hepatic artery produces a reflex vasoconstriction in the vascular bed of the upper mesenteric artery. A nutritional function of the mesenteric vascular reflexes is highly probable. O.H.

A72-15140 **Holography as an aid for verifying a model of red blood cell rotation (Holographie als Hilfsmittel zum Nachprüfen eines Modells der Rotation roter Blutkörperchen).** M. O. Breitmeyer (Baylor University, Houston, Tex.) and M. K. Sambandam (Institute of Technology, Terre Haute, Ind.). *Laser*, vol. 3, Dec. 1971, p. 44-47. 11 refs. In German.

A model of red blood cell rotation in the flow toward an orifice had been reported by Breitmeyer et al. (1971) for cell volume determination applications. A holographic technique is described for making moving red blood cells visible. Measurements regarding the orientation of the red blood cells, which flow toward the orifice, are transformed into distribution data regarding the form factor for the three orientations. The results are compared with the data predicted by the model. G.R.

A72-15210 **Effect of local cooling of the legs on tolerance to positive acceleration.** W. R. Keatinge (RAF, Institute of Aviation Medicine, Farnborough, Hants., England) and P. Howard (Medical

Research Council; Oxford University, Oxford, England). *Journal of Applied Physiology*, vol. 31, Dec. 1971, p. 819-822. 12 refs.

Local cooling of the legs without change in trunk skin temperature or oral temperature improved the ability to withstand positive (headward) acceleration in the sitting position. Arterial systolic, diastolic, and pulse pressures were maintained at higher levels, ankle circumference increased less, and the acceleration at which peripheral vision was lost increased on average by 0.27 G, when the legs were cold. The effects of leg cooling were attributable to reduced pooling of blood and increased vascular resistance in the legs due in turn to direct effects of low temperature on their blood vessels. (Author)

A72-15211 **Physiologic effects of 2,3-DPG-depleted red cells with high affinity for oxygen.** C. R. Valeri and F. B. Collins (U.S. Naval Hospital, Chelsea, Mass.). *Journal of Applied Physiology*, vol. 31, Dec. 1971, p. 823-827. 20 refs. Navy-supported research.

A study was undertaken to determine the physiologic effects of transfusing into patients with anemic hypoxia 3-5 units of washed liquid-stored red cells that were depleted of 2,3-diphosphoglycerate (DPG) and had an increased affinity for oxygen. Immediately after the therapeutic transfusion there was no change in oxygen consumption, but there was a significant decrease in both the arterial blood pH and the systemic arteriovenous difference in oxygen content, and the circulating red cells had an increased affinity for oxygen and a decreased red cell 2,3-DPG level. Within 4 hr after the transfusion, both the arterial pH and the systemic arteriovenous difference in oxygen content had returned toward the pretransfusion levels. During the 24-hr posttransfusion period the 2,3-DPG level and P50 value of the oxyhemoglobin dissociation curve were restored to normal in vivo. Prior to and 8 and 24 hr after transfusion, the cardiac index values measured by the indocyanine method and those calculated by the Fick formula were in accord. However, during the 4-hr posttransfusion period the cardiac index calculated by the Fick formula was significantly increased, while the cardiac index measured by the dye method was unchanged. (Author)

A72-15212 * **Peripheral modifications to the central drive for sweating.** E. R. Nadel, J. W. Mitchell, B. Saltin, and J. A. J. Stolwijk (Yale University, New Haven, Conn.). *Journal of Applied Physiology*, vol. 31, Dec. 1971, p. 828-833. 14 refs. NIH Grant No. ES-00354; Contract No. NAS9-9531.

Three subjects performed from 15 to 20 bouts of 10-min bicycle ergometer exercise in a 26 C ambient. The procedure imposed a consistent pattern of internal (esophageal) temperature increase in the presence of a constant mean skin temperature. Body weight loss was continuously recorded and rate of evaporative loss due to sweating was calculated during each minute of exercise. It was confirmed that both local and total sweating are functions of internal temperature at a fixed constant mean skin temperature. In the presence of a constant central drive for sweating, the sweating response could be modified at the periphery according to the area-specific characteristics and/or by local temperature. G.R.

A72-15213 **Muscle glycogen utilization during prolonged exercise on successive days.** D. L. Costill, R. Bowers, G. Branam, and K. Sparks (Ball State University, Muncie, Ind.). *Journal of Applied Physiology*, vol. 31, Dec. 1971, p. 834-838. 25 refs. Research supported by the Indiana Heart Association; NIH Grant No. HE-12877-01.

On 3 successive days each of the 5 subjects used ran 16.1 km on the horizontal treadmill. Before and within 5 min after each run muscle biopsies were obtained from the vastus lateralis for glycogen determination. Muscle glycogen utilization was greatest during the first 16.1-km run but was markedly less during the second and third

runs. Successive days of prolonged severe exertion produced a marked reduction of muscle glycogen concentration. Lactate accumulation during running was reduced with successive days of exercise, whereas serum free fatty acid levels tended to increase. G.R.

A72-15214 **Plasma renin activity in supine muscular exercise.** M. Aurell and P. Vikgren (Sahlgrenska Sjukhuset, Göteborg, Sweden). *Journal of Applied Physiology*, vol. 31, Dec. 1971, p. 839-841. 21 refs. Research supported by the Swedish Medical Research Council.

Repeated observations were made of the plasma renin activity (PRA) during supine physical exercise in normal subjects on different salt regimes. PRA was found to increase with both short-term maximal exercise to exhaustion (1,200 kpm/min for 10-14 min) and long-term submaximal exercise (600 kpm/min for 45 min). The increase in PRA was dependent on the salt intake of the subjects. With salt loading, virtually no increase in PRA was observed in either situation, but, with salt depletion, PRA roughly doubled during exercise. The low renin activity and the failure of PRA to rise during exercise in the salt-loaded state may be related to a diminished renal content of renin. (Author)

A72-15215 * **Diffusing capacity and anatomic dead space for carbon-18 monoxide.** P. D. Wagner, R. W. Mazzone, and J. B. West (California, University, La Jolla, Calif.). *Journal of Applied Physiology*, vol. 31, Dec. 1971, p. 847-852. 12 refs. PHS Grant No. HE-13687-01; Grant No. NGL-05-009-109.

Carbon monoxide (CO) is difficult to measure with a respiratory mass spectrometer because of the similar mass numbers of CO and nitrogen, but this is possible using carbon-18 monoxide. The mass resolution, signal-to-noise ratio, linearity, and background were all found to be adequate. The measurement of the single-breath diffusing capacity was examined. Unless the mean alveolar volume during breath holding is used in the calculation, the value for Dco obtained depends on which portion of the alveolar sample is analyzed. The anatomic dead space for CO was found to be almost the same as that for argon suggesting that the diffusion rate at the dead space-alveolar gas interface was not greatly affected by the alveolar concentration of the gas. (Author)

A72-15216 **Limb sweating rates overlying active and non-active muscle tissue.** C. L. Wells and E. R. Buskirk (Pennsylvania State University, University Park, Pa.). *Journal of Applied Physiology*, vol. 31, Dec. 1971, p. 858-863. 21 refs. NIH Grant No. AM-08311.

Experimental study to determine whether a local heating effect resulting from exercise would cause sweating rates overlying active muscle tissue to exceed those overlying nonactive muscle tissue. Two lean and two obese women performed contralateral arm-leg exercise representing 25 and 50% of their maximal oxygen consumption (25 and 50% WL). Two environmental temperatures (21 and 29 C T sub eff) were selected to vary external heat load while the two work loads varied internal body temperatures. Relationships among sweating rates (SR), skin temperatures (T sub s), subcutaneous temperatures (T sub sub), and core temperatures were examined. Active limb SR exceeded nonactive limb SR except in the most stressful experimental session. Positive relationships were found between limb SR and T sub s, limb SR and T sub sub, and total SR and core temperatures. An inverse relationship was found between limb SR and T sub sub - T sub s when the larger T sub sub - T sub s was associated with 21 C T sub eff. Higher limb SRs were found at the 50% WL than at the 25% WL for any given T sub s and T sub sub - T sub s value. Since localized T sub s, T sub sub, and SR measurements overlying active muscle tissue exceeded those overlying nonactive muscle tissue, it was concluded that a local heating effect resulting from muscle contraction enhanced localized sweat secretion. (Author)

A72-15217 * Splanchnic vasoconstriction in hyperthermic man - Role of falling blood pressure. L. B. Rowell, G. R. Profant, C. Wyss (Washington, University, Seattle, Wash.), and J.-M. R. Detry. *Journal of Applied Physiology*, vol. 31, Dec. 1971, p. 864-869. 20 refs. NIH Grant No. RR-37; Grant No. NGR-48-002-082.

Results of a study in which six supine resting subjects, wearing water-perfused suits, had body skin temperature controlled at 35°C for 30 min (control period), then rapidly increased to 40.5°C for 43 to 50 min (heating period) in a two-part experiment. In the first part of the experiment arterial mean pressure (MP) in three men was increased back to, or above control levels at the 30 to 35th min of heating by total occlusion of both legs for 8 to 10 min. Splanchnic blood flow (SBF), which had fallen from 1.4 to 0.9 L/min at occlusion, rose only 0.05 L/min during occlusion. Splanchnic vascular resistance (SVR) rose throughout heating and occlusion. In the second part of the experiment (three men) SBF fell despite a spontaneous rise in MP and aortic pulse pressure prior to leg occlusion. Cardiac output (CO) was measured just before, during and after occlusion. Occlusion raised MP 10 to 15 mm Hg and reduced CO only slightly. It is concluded that falling MP or aortic pulse pressure are not major causes of the splanchnic vasoconstriction in response to heating man. (Author)

A72-15218 Control of ventilation during speech. J. C. Bunn and J. Mead (Harvard University, Boston, Mass.). *Journal of Applied Physiology*, vol. 31, Dec. 1971, p. 870-872. 7 refs. NIH Grant No. AP-00229.

Observation that six of seven subjects while reading aloud increased minute ventilation from spontaneous levels 6 to 21%. They took fewer breaths per minute (average of 14 reading compared to 19) and all increased alveolar ventilation (average increase 27%). Every subject ventilated more while reading material with a preponderance of consonants requiring large volume increments (e.g., letters 'h' and 's') than material with mainly consonants requiring small volume increments (e.g., 'l', 'm', and 'n'). The subject who hyperventilated the most (62% increase in alveolar ventilation) and had the lowest end-tidal CO₂ partial pressure (29 mm Hg) had periods of apnea lasting up to 18 sec immediately after reading. The ventilatory response to CO₂ while reading averaged 1 liter/min per mm Hg increase in end-tidal CO₂ partial pressure compared to 3.6 during spontaneous breathing. The increase in ventilation was brought about by an increase in flow during phonation and by the introduction in five of the subjects of quick nonphonated expirations, usually at the end of a phrase. The frequency and relative duration of inspiration did not change. (Author)

A72-15219 Effect of chronic exercise on adrenocortical function and structure in the rat. R. J. Buuck and G. D. Tharp (Nebraska, University, Lincoln, Neb.). *Journal of Applied Physiology*, vol. 31, Dec. 1971, p. 880-883. 24 refs.

The effect of chronic exercise on plasma corticosterone and on the adrenal cortex was studied in the rat. Groups of male rats were exercised on a treadmill for 2, 4, 6, and 8 weeks. Chronic exercise was found to increase the resting levels of plasma corticosterone after 2 and 4 weeks. After 6 weeks these levels returned to near normal and were normal after 8 weeks. Both the trained and control rats after 8 weeks had similar high levels of corticosterone after an exhaustive exercise bout. The response of the adrenal cortex to exercise was similar to that of other stressors. The adrenal cortex was still responsive after long-term chronic exercise even though the plasma corticosterone levels were low at rest. The width of the zona fasciculata of the adrenal cortex increased significantly in trained rats and was responsible for the adrenal hypertrophy and the increased width of the adrenal cortex observed. (Author)

A72-15220 Neurophysiological effects of different anesthetics in conscious man. E. C. Hosick, D. L. Clark, N. Adam, and B. S. Rosner (Pennsylvania, University, Philadelphia, Pa.). *Journal of Applied Physiology*, vol. 31, Dec. 1971, p. 892-898. 30 refs. Research supported by the Ohio Medical Co.; PHS Grants No. 5P01-GM-15430; No. 5R01-MH-10848.

Neurophysiological and psychological effects of subanesthetic concentrations of cyclopropane, diethyl ether, methoxyflurane, and ethrane were studied in healthy human volunteers. Cerebral somatosensory potentials were evoked by ulnar nerve stimulation. All drugs studied preferentially suppressed long-latency components. Cyclopropane usually reduced direct lemniscal activity, while diethyl ether and the halogenated ethers had little effect. Methoxyflurane and ethrane produced bursts of 14- to 20-Hz activity in the EEG. Diethyl ether had a similar but less marked effect. Cyclopropane was unique in producing 4- to 7-Hz activity. Only the halogenated ethers elevated sensory thresholds. All drugs impaired ability to concentrate and affected time perception. Ether alone produced amnesia. Chemically different anesthetics thus produce differential neurophysiological and psychological effects. (Author)

A72-15221 A stochastic signal method for measuring dynamic mechanical properties of muscle. W. Halpern and N. R. Alpert (Vermont, University, Burlington, Vt.). *Journal of Applied Physiology*, vol. 31, Dec. 1971, p. 913-925. 54 refs. PHS Grant No. 5R01-HE-10892-04.

Description and evaluation of a new method which demonstrates the feasibility of quantifying the changing viscoelastic parameters of isometric frog sartorius muscle at rest and throughout contraction using pseudo-random white noise vibrations. Displacements as small as 0.06% L sub zero disturb the cross bridges and other fine structures in a minimal way while identifying a muscle model in successive periods as brief as 50 msec. One elastic and one pure viscous element that derive their nonlinear properties from the contractile myofibrillar machinery were found for the resting and active states of this muscle. The analyses also defined a component corresponding to the conventional series elastic element and permitted measurement of the tension propagation velocity which reflected the mean elastic modulus in the frequency range from 2.5 to 670 Hz. Force-velocity characteristics and the time variation of the internal force generator may be derived from these results. (Author)

A72-15222 Comparative sensitivity of four methods for measuring changes in respiratory flow resistance in man. N. R. Frank, J. Mead, and J. L. Whittenberger (Harvard University, Boston, Mass.). *Journal of Applied Physiology*, vol. 31, Dec. 1971, p. 934-938. 15 refs. NIH Grants No. AP-00229; No. ES-0002; No. EC-00442.

Comparison of the sensitivity of four methods used to measure respiratory flow resistance. Small changes in flow resistance in human subjects were induced with sulfur dioxide (SO₂), an irritant gas. Before, during, and after the exposure the flow resistance was determined by the following methods: esophageal catheter, plethysmographic (DuBois), forced pressure oscillations, and airway interrupter method. The first method estimates total pulmonary flow resistance; the second estimates airway resistance alone; the third estimates total respiratory resistance - i.e., lungs plus chest wall; and the fourth estimates total pulmonary flow resistance plus some fraction of chest wall resistance. Thus, all four methods are responsive to changes in airway caliber. Insofar as SO₂ affects only the latter, it might be expected that the absolute changes seen with these methods are identical. On the other hand airway resistance, once it becomes elevated, may vary as a function of frequency. Since the four methods rely upon widely different cycling frequencies, they in turn might be expected to register different degrees of change. It is found that the absolute changes in flow resistance

during exposure to SO₂ did vary among the methods. The changes were inversely correlated with the cycling frequencies. Nevertheless, once the variance or 'error' of each method and the volume history of the lungs prior to each measurement were taken into account, three of the methods showed nearly comparable sensitivities. The fourth, the interrupter method, appeared to be the least sensitive to change. (Author)

A72-15223 A simple multichannel spike height discriminator. J. A. Freeman (MIT, Cambridge, Mass.). *Journal of Applied Physiology*, vol. 31, Dec. 1971, p. 939-941. USAF-supported research.

Different criteria for separating the electrical activity of multiple single neural units recorded with the same microelectrode are discussed, and a simple multichannel spike height discriminator is presented which uses state-of-the-art integrated circuitry. Several advantages of the device are (1) its accuracy, fast response time, and high noise immunity; (2) its low cost and ease of construction; and (3) its multichannel capability. (Author)

A72-15228 * # Parathyroid hormone - Secretion and metabolism in vivo. J. F. Habener, D. Powell, T. M. Murray, G. P. Mayer, and J. T. Potts, Jr. (Massachusetts General Hospital; Harvard University, Boston, Mass.; Pennsylvania, University, Kennett Square, Pa.). *National Academy of Sciences, Proceedings*, vol. 68, Dec. 1971, p. 2986-2991. 18 refs. Research supported by the John A. Hartford Foundation and NASA; NIH Grants No. AM-05205; No. AM-11794; No. AM-04501.

Gel filtration and radioimmunoassay were used to determine the molecular size and immunochemical reactivity of parathyroid hormone present in gland extracts, in the general peripheral circulation, and in parathyroid effluent blood from patients with hyperparathyroidism, as well as from calves and from cattle. It was found that parathyroid hormone secreted from the parathyroids in man and cattle is at least as large as the molecule extracted from normal bovine glands. However, once secreted into the circulation the hormone is cleaved, and one or more fragments, immunologically, dissimilar to the originally secreted hormone, constitute the dominant form of circulating immunoreactive hormone. G.R.

A72-15230 # Variation of the state of the central nervous system and the motor apparatus during mental and physical work (Izmenenie sostoiianiia tsentral'noi nervnoi sistemy i dvigatel'nogo apparata pri umstvennoi i fizicheskoi nagruzhkakh). Z. I. Kamenetskaia (Sanitarno-Gigienicheskii Meditsinskii Institut; Institut Gigieny Truda i Profzabolevanii, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Oct. 1971, p. 1429-1435. 14 refs. In Russian.

Comparison of the variation of the functional state indices of the central nervous system and the motor apparatus in young people after measured mental and physical work. Short-term mental work is found to have a certain beneficial effect both on the indices of the central nervous system and on the state of the motor apparatus. More prolonged mental work causes deterioration of the investigated indices. A muscular load in a range of small physical stresses which do not cause extreme fatigue of the motor apparatus improves the indices of the central nervous system. The results of a correlation analysis show that certain relations are observed between variations in the parameters of the central nervous system and the motor apparatus during both mental and physical labor. A.B.K.

A72-15231 # Intercentral relations in the brains of animals in various poses and during certain forms of motor activity (Mezhtsentral'nye vzaimootnosheniia v golovnom mozgu zhivotnykh

pri razlichnykh pozakh i nekotorykh formakh dvigatel'noi aktivnosti). N. B. Kudriavtseva (Institut Eksperimental'noi Meditsiny, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Oct. 1971, p. 1436-1440. 12 refs. In Russian.

Study of the intercentral relations in chronic experiments on cats and dogs in various poses and during motor activity, according to the bioelectric activity index. The cross-correlation function method is used to study these relations, and two types of connections are distinguished - pulsed and cyclic. A variation of the relation between the bioelectric processes of the cortex and certain deep structures of the brain is noted in various poses and during motor activity. The most noticeable variations are those of connections between structures which pertain to the realization of motor activity and between the motor cortex and these structures on the side of the moving extremity. A.B.K.

A72-15232 # Mechanisms of hemodynamic changes during muscle activity (O mekhanizmax izmenenii gemodinamiki pri myshechnoi deiatel'nosti). S. A. Bershtein, N. V. Il'chevich, T. Mansurov, and M. M. Seredenko (Akademiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR; Andizhanskii Gosudarstvennyi Pedagogicheskii Institut, Andizhan, Uzbek SSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Oct. 1971, p. 1514-1521. 45 refs. In Russian.

Experimental study of the variation of the basic hemodynamic indices of unanesthetized dogs during hypoxia at rest and during muscle activity performed in the presence of normal and reduced O₂ contents in the inhaled air. The hemodynamic shifts are compared with variations in the oxygen parameters of the blood. It is found that both physical exertion and a decrease in the O₂ content in the inhaled air lead to qualitatively similar but quantitatively different changes in the basic hemodynamic parameters. It is suggested that the mechanisms of the hemodynamic shifts occurring during motor activity and hypoxia are of common nature. It is thought that this may serve as a confirmation of notions concerning the role of a decrease in the oxygen partial pressure in the blood and tissues in mechanisms of development of hemodynamic variations during muscle activity. A.B.K.

A72-15233 # Changes in the coagulating and anticoagulating blood systems during parachute jumps (Izmeneniia v svertvyvaiushchei i antisvertvyvaiushchei sistemakh krovi pri pryzhkakh s parashiotom). P. I. Gvozdev, M. I. Lytkin, and A. S. Mozhukhin (Voenno-Meditsinskaiia Akademiia, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Oct. 1971, p. 1526-1530. 10 refs. In Russian.

Study of the coagulating and anticoagulating blood systems in 226 men subjected to emotional stress during parachute jumps. It is found that during preparation for a jump and immediately after one changes in the coagulating and anticoagulating blood systems occur which lead to a state of hypocoagulation. In particular, a statistically meaningful increase in the plasma recalcification time is observed, as well as a decrease in the prothrombin index, an increase in the heparin time and number, and an increase in fibrinolytic activity. A.B.K.

A72-15234 # Physiological justification of criteria of resistance to and endurance of hypoxia in various age groups (K fiziologicheskomu obosnovaniui kriteriev ustoiichivosti i vynoslivosti k gipoksii v razlichnye vozrastnye periody). V. D. Rozanova and I. S. Ugolbaeva (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Oct. 1971, p. 1531-1539. 36 refs. In Russian.

Study of the reactions of dogs of various ages to a stepwise ascension in a pressure chamber to altitudes from 1 to 13 km and to

an abrupt ascension to altitudes of 7 and 10 to 13 km. It is shown that the initial homeostasis during all forms of ascension is retained longer in adult dogs than in puppies 1 to 15 days and 18 to 60 days old. On the other hand, the altitude ceiling and the survival time of adult dogs are less than those of puppies 1 to 15 days old. It is concluded that it is necessary to distinguish between the concepts and criteria of resistance (with respect to length of retention of homeostasis) and endurance (with respect to differences in altitude ceiling and survival time in a state of collapse). A.B.K.

A72-15235 # **Afferentation during prolonged local vibration (Afferentatsiia vo vremia dlitel'noi lokal'noi vibratsii).** V. A. Bainov (Sanitar'no-Gigienicheskii Meditsinskii Institut, Leningrad, USSR). *Fiziologicheskii Zhurnal SSSR*, vol. 57, Oct. 1971, p. 1545-1547. 6 refs. In Russian.

Evaluation of recordings of the afferent impulses in the sciatic nerve of frogs and rabbits during prolonged (1 hour) sinusoidal vibration of the foot (vibration frequencies from 25 to 350 Hz). A synchronism between the responses of the receptors to vibratory stimulation is noted in frogs subjected to an hour-long excitation at frequencies from 25 to 40 Hz and in rabbits at frequencies from 25 to 300 Hz. At increasingly higher frequencies, the duration of synchronous responses is shortened proportionately, until finally synchronous responses are observed only during the first seconds of excitation. A.B.K.

A72-15248 **Visual evoked responses to word and nonsense syllable stimuli.** S. A. Shelburne, Jr. (Cincinnati, University, Cincinnati, Ohio). *Electroencephalography and Clinical Neurophysiology*, vol. 32, Jan. 1972, p. 17-25. 19 refs. PHS Grant No. HD-05221.

New techniques were used in which language stimuli, in the form of word and nonsense syllable trigrams, were presented visually and the evoked cortical responses from scalp electrodes were analyzed by appropriate electroencephalographic and computer techniques. Visual evoked responses (VERs) from word stimuli and nonsense stimuli were compared, and responses from left and right cerebral hemispheres were evaluated to see if there were differences between the dominant and nondominant sides. In the initial studies, the word stimuli were relevant to a problem-solving task, and the nonsense syllables were not. The problems of correlating VERs with meaningfulness, task relevance, and other psychophysiological variables were investigated further. The basic long-term objective was to develop a neurophysiological test for studying reading disabilities. M.V.E.

A72-15249 **Vestibulo-ocular responses in man during sleep.** G. M. Jones (Defence Research Board, Dept. of Physiology, Montreal, Canada) and N. Sugie (Ministry of International Trade and Industries, Electrotechnical Laboratory, Tokyo, Japan). *Electroencephalography and Clinical Neurophysiology*, vol. 32, Jan. 1972, p. 43-53. 23 refs.

The vestibulo-ocular response of human subjects to prolonged oscillatory rotational stimulation has been investigated during various stages of sleep and arousal. Five main categories or stages of response have emerged, according to the depth of sleep, and these are discussed in terms of a mathematical model of the vestibulo-ocular reflex system previously formulated by Sugie and Jones (1971) from results of experiments with cats. It is shown that an appropriate modification of that previously described model can simulate the major findings obtained with human subjects. M.V.E.

A72-15250 **Blink reflexes during sleep and wakefulness in man.** E. Ferrari and C. Messina (Messina, Università, Messina, Italy). *Electroencephalography and Clinical Neurophysiology*, vol. 32, Jan. 1972, p. 55-62. 38 refs.

Blink reflexes were studied in man during the sleep-wakefulness cycle and in wakefulness in relation to the vigilance level and emotional state. Mono- and polysynaptic responses to electrical stimuli to the supraorbital branch of the fifth nerve were recorded electromyographically from orbicularis oculi. Electrical cerebral activity, eye movement, suprahyoid muscle activity, electrocardiogram, and skin resistance were monitored at the same time. The obtained data reveal the particular functional situation of the reflex arcs controlling the facial muscles supporting mimetic expression. M.V.E.

A72-15251 **Receptor and neural responses in auditory masking of low frequency tones.** J. T. Marsh, J. C. Smith, and F. G. Worden (California, University, Los Angeles, Calif.; Neurosciences Research Program, Brookline, Mass.). *Electroencephalography and Clinical Neurophysiology*, vol. 32, Jan. 1972, p. 63-74. 18 refs. PHS Grant No. MH-03831-11.

Responses from cochlea and cochlear nucleus were recorded in cats through gross electrodes, using stimulus conditions under which masking effects had been demonstrated with human subjects. With successive intensity increments of the noise masker relative to the tone stimulus, the neural 'frequency-following response' (FFR) showed a significantly greater diminution in amplitude than did the cochlear microphonic. In order to explore further the neural mechanisms involved, experiments were performed to study the activity of single cells in the cochlear nucleus under the same stimulus conditions. Cells that fired in phase-locked fashion to the tone frequency showed progressive desynchronization with increasing intensity of the noise masker. These results support the hypothesis that the noise preempts the activities of units which would otherwise be part of the phase-locked neural population contributing to the grossly recorded FFR envelope. M.V.E.

A72-15252 **New device for the localized cooling of nerve structures (Nouveau dispositif pour le refroidissement localisé des structures nerveuses).** M. Benita (Paris, Université, Laboratoire de Physiologie Générale et Laboratoire de Physiologie Cellulaire, Orsay, Essonne, France). *Electroencephalography and Clinical Neurophysiology*, vol. 32, Jan. 1972, p. 90-94. 22 refs. In French.

The localized cooling produced at the tip of a cryogenic probe, which is insulated by a vacuum jacket up to about 1 mm from its extremity, is controlled by a closed circuit apparatus. The apparatus regulates the fluid expansion and gives the desired cooling temperatures with a precision of 1 C. At the tip of the probe inserted in the brain, the range of cooling extends from -20 to +20 C. Any particular level of cooling is reached within 5 sec, and the return to 37 C is within 10 sec. M.V.E.

A72-15253 **A neuroelectric signal recognition system.** V. J. Prochazka, B. Conrad, and F. Sindermann (Ulm, Universität, Ulm, West Germany). *Electroencephalography and Clinical Neurophysiology*, vol. 32, Jan. 1972, p. 95-97. 11 refs.

A neuroelectric signal recognition system is described that uses a laboratory computer which fully compensates for such sources of variation as (1) small random changes, (2) slow trends in a given unit, and (3) interference potentials of simultaneously occurring units. The system possesses a very reliable sorting capability and can be readily integrated with existing laboratory setups since it requires no special peripheral equipment. M.V.E.

A72-15259 * Role of water activity in the dry heat sterilization of micro-organisms. J. P. Brannen (Sandia Laboratories, Albuquerque, N. Mex.). *Journal of Theoretical Biology*, vol. 32, 1971, p. 331-334. 16 refs. NASA-supported research. NASA Order W-12853.

Discussion of the results of a kinetic analysis of spore survival as a function of water activity, aimed at shedding light on the nature of water activity's role in dry heat sterilization. The results obtained suggest that the role of water activity may be that of altering molecular stability through changing the entropy of activation with water activity changes. M.V.E.

A72-15261 * Dry-heat resistance of *Bacillus subtilis* var. niger spores on mated surfaces. G. J. Simko, J. D. Devlin, and M. D. Wardle (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). *Applied Microbiology*, vol. 22, Oct. 1971, p. 491-495. 10 refs. Contract No. JPL-952137.

Bacillus subtilis var. niger spores were placed on the surfaces of test coupons manufactured from typical spacecraft materials including stainless steel, magnesium, titanium, and aluminum. These coupons were then juxtaposed at the inoculated surfaces and subjected to test pressures of 0, 1000, 5000, and 10,000 psi. Tests were conducted in ambient, nitrogen, and helium atmospheres. While under the test pressure condition, the spores were exposed to 125 C for intervals of 5, 10, 20, 50, or 80 min. Survivor data were subjected to a linear regression analysis that calculated decimal reduction times. G.R.

A72-15266 # Biodynamic models and their applications. H. E. von Gierke (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio). *Acoustical Society of America, Journal*, vol. 50, Dec. 1971, pt. 1, p. 1397-1413. 60 refs.

Progress in modeling the mechanical response of man exposed to various environmental forces is discussed. Starting with a mathematical description of the mechanical and physical characteristics of the integument, soft and hard tissue, the approaches taken and results obtained from modeling various integrated elements such as the human vertebral column under vibration and impact loads, the chest, and respiratory system under vibratory and blast loads and of the whole body system for selected force input conditions and locations are reviewed. To derive a capability of modeling specific injury modes or experimentally observed probabilities of injury curves for various parenchymatous and hollow organs as a function of the force input variables, more detailed and specialized models are being used such as, for example, the lumped parameter, discrete parameter, and continuum model of the spine or models considering nonlinear tissue behavior. M.M.

A72-15299 Quantitative relationships between ultrasonic cavitation and effects upon amoebae at 1 MHz. W. T. Coakley and D. Hampton (South Wales and Monmouthshire, University College, Cardiff, Wales) and F. Dunn (Illinois, University, Urbana, Ill.). *Acoustical Society of America, Journal*, vol. 50, Dec. 1971, pt. 2, p. 1546-1553. 19 refs. Research supported by the Medical Research Council.

An amoeba, *Hartmannella castellanii*, which possesses many features typical of higher-order animal cells, was irradiated with 1-MHz ultrasound while suspended in ordinary growth medium and in one with increased viscosity. The ultrasonically produced cavitation was monitored and a strong correlation is found between the number of discrete cavitation events occurring and the decrease in cell numbers, on irradiating at 515 W/sq cm for 10 min. The growth of treated cells was also examined. (Author)

A72-15361 Analgesia from electrical stimulation in the brainstem of the rat. D. J. Mayer, T. L. Wolffe, H. Akil, B. Carder, and J. C. Liebeskind (California, University, Los Angeles, Calif.). *Science*, vol. 174, Dec. 24, 1971, p. 1351-1354. 18 refs. Research supported by the University of California; PHS Grant No. NS-07628.

Stimulation at several mesencephalic and diencephalic sites abolished responsiveness to intense pain in rats while leaving responsiveness to other sensory modes relatively unaffected. The peripheral field of analgesia was usually restricted to one-half or to one quadrant of the body, and painful stimuli applied outside this field elicited a normal reaction. Analgesia outlasted stimulation by up to 5 minutes. Most electrode placements that produced analgesia also supported self-stimulation. One placement supported self-stimulation only in the presence of pain. (Author)

A72-15464 Pulmonary vascular response to exercise in the dog. R. C. Elkins (Oklahoma, University, Oklahoma City, Okla.) and W. R. Milnor (Johns Hopkins University, Baltimore, Md.). *Circulation Research*, vol. 29, Dec. 1971, p. 591-599. 24 refs. NIH Grants No. 1-T01-GM-01541-01; No. HE-12607.

The effects of exercise on the pulmonary circulation were studied in seven experiments of five dogs. Pulsatile pulmonary arterial flow and pressure and left atrial pressure were measured by chronically implanted transducers. Pulmonary vascular input impedance, resistance, and hydraulic power were computed. The average effects of running on a treadmill at 6.5 mph, as compared with the resting state, were an increase in cardiac output from 2.59 liters/min to 5.30 liters/min, and a rise in mean pulmonary arterial pressure from 18 mm Hg to 28 mm Hg. G.R.

A72-15465 * Mechanism of pulmonary conversion of angiotensin I to angiotensin II in the dog. S. Oparil, G. W. Tregear, T. Koerner, B. A. Barnes, and E. Haber (Harvard University; Massachusetts General Hospital, Boston, Mass.). *Circulation Research*, vol. 29, Dec. 1971, p. 682-690. 28 refs. Research supported by the John A. Hartford Foundation; NIH Grants No. HE-14150-01; No. 5-F03-HE-44850-02; Grant No. NGR-22-016-007.

The conversion mechanism was studied in vivo in the pulmonary circulation of the intact anesthetized dog and in vitro in plasma by using L-Leu-angiotensin I, D-Leu-angiotensin I, and des-Leu-angiotensin I which had been synthesized by the solid-phase technique. The results obtained indicate that pulmonary conversion in vivo and plasma conversion in vitro occur via a dipeptidylcarboxypeptidase and that a D-amino acid at the C-terminus prevents conversion. G.R.

A72-15466 * Effects of viscosity and constraints on the dispersion and dissipation of waves in large blood vessels. I. E. Jones, M. Anliker, and I.-D. Chang (Stanford University, Stanford; NASA, Ames Research Center, Moffett Field, Calif.). *Biophysical Journal*, vol. 11, Dec. 1971, p. 1085-1120. 24 refs. Grant No. NGR-05-020-223.

Investigation of the effects of blood viscosity on dissipation as well as dispersion of small waves in arteries and veins by means of a parametric study. A linearized analysis of axisymmetric waves in a cylindrical membrane that contains a viscous fluid indicates that there are two families of waves: a family of slow waves and one of fast waves. The faster waves are shown to be more sensitive to variations in the elastic properties of the medium surrounding the blood vessels and at high values of the frequency parameter α . At low values of α the effects of viscosity on attenuation are reversed. F.R.L.

A72-15467 * Effects of viscosity and constraints on the dispersion and dissipation of waves in large blood vessels. II. E. Jones, M. Anliker, and I.-D. Chang (Stanford University, Stanford; NASA, Ames Research Center, Moffett Field, Calif.). *Biophysical Journal*, vol. 11, Dec. 1971, p. 1121-1134. 15 refs. Grant No. NGR-05-020-223.

Comparison of previously described theoretical predictions with in vivo data from anesthetized dogs. It is shown that the observed attenuation of the pressure and axial waves cannot be accounted for by fluid viscosity alone. For large values of the frequency parameter α , the previous analysis is extended to include the effects of viscoelasticity of the vessel wall. The results indicate that the speeds of both types of waves are essentially unaffected by a realistic viscoelasticity model while the attenuation per wavelength is significantly increased and becomes frequency independent. There is fair agreement between theory and experiment. F.R.L.

A72-15516 * Photorecovery of gamma irradiated cultures of blue-green alga, *Anacystis nidulans*. Y. Asato (NASA, Ames Research Center, Moffett Field, Calif.). *Radiation Botany*, vol. 11, 1971, p. 313-316. 14 refs.

Evidence is given for photorecovery of *Anacystis nidulans* after exposures to Co 60 gamma radiation. After irradiation the levels of viable cells were higher in cultures kept in white light than in cultures kept dark for 24 hr. The post-irradiation survival rate increase after 30-min exposures to visible light is demonstrated in cultures irradiated with 35 krad. An increase in survival rates was not observed after exposures to 'red' light. V.Z.

A72-15546 * Temperature adaptation of active sodium-potassium transport and of passive permeability in erythrocytes of ground squirrels. S. L. Kimzey and J. S. Willis (NASA, Manned Spacecraft Center, Houston, Tex.). *Journal of General Physiology*, vol. 58, Dec. 1971, p. 634-649. 20 refs. NIH Grant No. GM-11494.

Unidirectional active and passive fluxes of K-42 and Na-24 were measured in red blood cells of ground squirrels (hibernators) and guinea pigs (nonhibernators). As the temperature was lowered, 'active' (ouabain-sensitive) K influx and Na efflux were more considerably diminished in guinea pig cells than in those of ground squirrels. The fraction of total K influx which is ouabain-sensitive in red blood cells of ground squirrels was virtually constant at all temperatures, whereas it decreased abruptly in guinea pig cells as temperature was lowered. M.V.E.

A72-15581 # The role of reinforcement in the formation and short-lived storage of trace processes in man (Rol' podkrepleniia v formirovanii i kratkovremennom khraneni sledovykh protsessov u cheloveka). L. G. Voronin, V. F. Kononov, and I. S. Serikov (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino-na-Oke, USSR). *Zhurnal Vyshej Nervnoi Deiatel'nosti*, vol. 21, Sept.-Oct. 1971, p. 891-897. 19 refs. In Russian.

Sound was used as a conditioned stimulus and 0.5, 3 and 6-sec light signals were used as reinforcing unconditioned stimuli in a study of the generation and storage of trace responses in 36 subjects 14 to 24 years old. Observations of galvanic skin reactions indicated a longer persistence of trace responses after 0.5 and 6-sec light signals than after 3-sec light signals. Skin reactions vanished quickly when the subjects closed their eyes during exposures to 3-sec light stimuli. V.Z.

A72-15582 # A conditioned /artificial and natural/unconditioned reflex system (O sisteme uslovnyi /iskusstvennyi i natural'nyi-bezuslovnyi refleksy). M. M. Kol'tsova and V. I. Syrenskii (Akademiia Pedagogicheskikh Nauk SSSR, Institut Fizio-

logii Detei i Podrostkov, Leningrad, USSR). *Zhurnal Vyshej Nervnoi Deiatel'nosti*, vol. 21, Sept.-Oct. 1971, p. 898-903. 17 refs. In Russian.

Demonstration that a conditioned reflex is a component of a conditioned-unconditioned reflex system which controls the development of adaptive behavioral patterns. Experiments are conducted to show that a natural conditioned reflex is an intermediate component of such reflex systems. The usefulness of a study of such systems for the understanding of complex higher nervous activity forms is pointed out. V.Z.

A72-15583 # Effect of frontal lobe damage on motor reflexes in apes (Vlianie razrusheniia lobnykh dolei na dvigatel'nyi refleks u obez'ian). Sh. L. Dzhalagonia (Akademiia Meditsinskikh Nauk SSSR, Sukhumi, Georgian SSR). *Zhurnal Vyshej Nervnoi Deiatel'nosti*, vol. 21, Sept.-Oct. 1971, p. 943-949. 22 refs. In Russian.

Conditional motor reflexes were investigated in four baboon apes with extirpated and separated sections of Lobus frontalis. The effect of this damage on the higher nervous activity of the animals was manifested in a disturbed sense of relationship to each other, in an upset communication capability and in emotional behavior. A stimulated motor activity and alimentary reflex excitation were also apparent in the operated apes. V.Z.

A72-15584 # Determination of a hemisphere dominancy by dichotic speech audition (Opredelenie dominantnosti polusharii pri pomoshchi dikhoticheskogo proslushivaniia rechi). E. P. Kok, V. S. Kochergina, and L. V. Iakusheva (Ministerstvo Zdravookhraneniia SSSR, Institut Gigeny Detei i Podrostkov, Moscow, USSR). *Zhurnal Vyshej Nervnoi Deiatel'nosti*, vol. 21, Sept.-Oct. 1971, p. 1012-1017. 21 refs. In Russian.

Description of a technique for estimating the prevalence of the right ear in a hearing process when different words are delivered simultaneously to both ears. The right ear prevalence was 15.4% in a group of 24 healthy subjects examined by this technique. The left ear prevalence rates in individual subjects are discussed. V.Z.

A72-15585 # The role of certain deep cerebral formations on sleep process control in man (O roli nekotorykh glubinykh obrazovani golovnogogo mozga cheloveka v regulatsii protsessov sna). N. I. Moiseeva (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) and E. L. Kolesova (Vtoraia Gorodskaja Bol'nitsa, Leningrad, USSR). *Zhurnal Vyshej Nervnoi Deiatel'nosti*, vol. 21, Sept.-Oct. 1971, p. 1018-1022. 22 refs. In Russian.

Actographic observations of night sleep in parkinsonism patients prior to and after electric current applications to the ventrolateral and dorsomedial nuclei of the optic thalamus, to the nucleus caudatus, to the globus pallidus and to the internal capsule. Decreased duration of deep sleep was observed after neuron population stimulation in Globus pallidus and ventrolateral nucleus. V.Z.

A72-15586 # Effect of some adrenotropic agents on perception and on the subthreshold action of sound under emotional stress conditions (Vlianie nekotorykh adrenotropnykh veshchestv na vospriatie i podporogovoe deistvie zvuka v usloviakh emotsional'nogo stressa). N. N. Zakharova (Tsentral'nyi Nauchno-Issledovatel'skii Institut Sudebnoi Psikhatrii, Moscow, USSR). *Zhurnal Vyshej Nervnoi Deiatel'nosti*, vol. 21, Sept.-Oct. 1971, p. 1040-1046. 15 refs. In Russian.

The effect of phenamine and aminazine injections was investigated in a group of emotionally unstable subjects who were brought in a state of emotional stress by disturbing oral information. A relation is established between the perception characteristics of the subjects and the inherent excitability of their adrenoreactive structures. V.Z.

A72-15587 # Nature of motor neuron reflex response in human arm muscles (Priroda reflektornogo otveta motoneironov myshts ruki cheloveka). V. A. Mart'ianov and Iu. A. Kopylov (Institut Fizicheskoi Kul'tury, Moscow, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 21, Sept.-Oct. 1971, p. 1092-1095. 14 refs. In Russian.

Study of the responses of *Musculus abductor digiti quinti* to the excitation of the ulnar nerve by rectangular pulses in a total of 150 experiments on a group of 10 healthy male subjects. Similarity is observed between these responses and the responses of *Musculus gastrocnemius* during the stimulation of *Nervus tibialis*. V.Z.

A72-15588 # Investigation of a successive visual illusion of motion (Issledovanie zritel'noi posledovatel'noi illiuzii dvizheniia). M. B. Zykov and V. F. Kononov (Akademiia Nauk SSSR, Institut Biologicheskoi Fiziki, Pushchino-na-Oke, USSR). *Zhurnal Vysshei Nervnoi Deiatel'nosti*, vol. 21, Sept.-Oct. 1971, p. 1107-1109. In Russian.

Description of a technique for examining the visual perception of a rotating kymograph drum by the human eye. The drum, covered with millimeter graph paper, is observed through a slot in a screen during rotation in either direction, intermissions and reversed rotation at different speeds and exposure times. The impressions of the subject are recorded during and after exposures. V.Z.

A72-15719 Effects of ischemia and reoxygenation on regional myocardial performance of the dog. H. Tomoda, W. W. Parmley, S. Fujimura, and J. M. Matloff (Cedars-Sinai Medical Center, Los Angeles, Calif.). *American Journal of Physiology*, vol. 221, Dec. 1971, p. 1718-1721. 15 refs. PHS Grants No. HE-13297; No. 5-S01-RR-05468.

The mechanics of contraction of regional areas of the myocardium were examined during transient ischemia and reoxygenation in 10 open-chested anesthetized dogs. Following reoxygenation, there was an increase in the duration of contraction and relaxation time, together with a slight overshoot in force development in the left anterior descending coronary artery (LAD). Repeated or prolonged episodes of ischemia produced local contractile alternans in the LAD area, associated with pulsus alternans. Thus, the results of this study demonstrate that the segmental alteration of contractile force induced by ischemia and reoxygenation may produce local asynchrony and pulsus alternans by virtue of changes in force development, the duration of contraction and relaxation, and segmental patterns of contractile alternans. M.M.

A72-15720 * Myocardial correlates of helium-cold induction and maintenance of hypothermia. G. L. Anderson, R. Prewitt, Jr., and X. J. Musacchia (Missouri University, Columbia, Mo.). *American Journal of Physiology*, vol. 221, Dec. 1971, p. 1760-1762. 18 refs. PHS Grant No. 5-F01-GM-41418-03; Grant No. NGR-26-004-021.

Hypothermia was induced in the golden hamster *Mesocricetus auratus*, using the helium-cold method. The first group of hamsters was sacrificed immediately after induction to rectal temperature 7°C, a second group was sacrificed after being maintained at a body temperature of 7°C for 18-24 hr, and a third group consisted of unexposed controls. The hearts were excised and the ventricles analyzed for hypoxic damage, glycogen, and catecholamines. In the

short-term hypothermic animals, resting tension was increased while peak isometric tension, generated tension after 10 min of anoxic exposure, glycogen, and catecholamines were all reduced. All of the functional parameters recovered in the long-term hypothermic group, while glycogen and catecholamines showed a trend toward recovery. It is concluded that myocardial hypoxia develops during induction into hypothermia when using the helium-cold method. This effect is reversible and hypoxic damage does not increase as the hypothermic exposure is prolonged. (Author)

A72-15721 * Erythropoietic radiosensitivity of the rat during altitude acclimatization. J. F. Gaugl (California University, Berkeley, Calif.). *American Journal of Physiology*, vol. 221, Dec. 1971, p. 1763-1767. 17 refs. Grant No. NGL-05-003-024.

The effect of a sublethal dose (300 R) of X-radiation upon the erythropoietic system of the rat, during 60-day acclimatization to moderate hypoxia (3,800 m altitude), was studied. Past work has shown that hypoxic animals are damaged less by radiation than animals irradiated in a normal environment; therefore, it was postulated that if, after acclimatization to hypoxia the bone marrow oxygen tension returns to sea-level values, these animals should suffer radiation damage equivalent to animals at sea level. The principal parameters followed were the rate of depletion of injected Fe-59 from the plasma of chronically catheterized rats, and its subsequent reappearance in the circulating erythrocytes. After 20 days of acclimatization, both parameters for altitude-irradiated animals returned to the values of animals irradiated at sea level, previously having reflected increased erythropoiesis. In altitude nonirradiated animals the parameters indicated erythropoietic stimulation persisting up to 45 days acclimatization. The protective effect of the hypoxia on the stem cells vanished during acclimatization, presumably as cellular oxygen tension rose. (Author)

A72-15722 * Hypothalamic stimulation and baroreceptor reflex interaction on renal nerve activity. M. F. Wilson, I. Ninomiya, G. N. Franz, and W. V. Judy (West Virginia University, Morgantown, W. Va.). *American Journal of Physiology*, vol. 221, Dec. 1971, p. 1768-1773. 24 refs. NIH Grant No. HE-10234-04; Grant No. NGL-49-001-001.

The basal level of mean renal nerve activity (MRNA-0) measured in anesthetized cats was found to be modified by the additive interaction of hypothalamic and baroreceptor reflex influences. Data were collected with the four major baroreceptor nerves either intact or cut, and with mean aortic pressure (MAP) either clamped with a reservoir or raised with l-epinephrine. With intact baroreceptor nerves, MRNA stayed essentially constant at level MRNA-0 for MAP below an initial pressure P1, and fell approximately linearly to zero as MAP was raised to P2. Cutting the baroreceptor nerves kept MRNA at MRNA-0 (assumed to represent basal central neural output) independent of MAP. The addition of hypothalamic stimulation produced nearly constant increments in MRNA for all pressure levels up to P2, with complete inhibition at some level above P2. The increments in MRNA depended on frequency and location of the stimulus. A piecewise linear model describes MRNA as a linear combination of hypothalamic, basal central neural, and baroreceptor reflex activity. (Author)

A72-15729 Space biological experiments at Kourou (Expériences biologiques spatiales à Kourou). R. G. A. Lotz (Frankfurt, Universität, Frankfurt am Main, West Germany). *La Recherche Spatiale*, vol. 10, Sept.-Oct. 1971, p. 20, 21. In French.

Results of rocket experiments to determine the effect of the space environment on leeches. One experiment dealt with the problems of the biorhythm and the influence of the space environment on metabolism. A second experiment studied the effect of radiations on reproduction and growth. Telemetry indicated that the leeches moved as usual up to the moment of reentry, and that they behaved normally during the period of weightlessness. F.R.L.

STAR ENTRIES

N72-11989# Joint Publications Research Service, Washington, D.C.

SPACE BIOLOGY AND MEDICINE, VOLUME 5, NO. 4, 1971

O. G. Gazenko, ed. 3 Nov. 1971 144 p refs Transl. into ENGLISH of the Journal Kosmicheskaya Biol. Med., Moscow, Meditsina Publishing House, v. 5, no. 4, 1971 p 3-88 (JPRS-54396) Avail: NTIS

Papers are presented on the physiological effects of spacecraft environmental conditions on humans and biological problems. Emphasis is on hypokinesia, acceleration stresses, and medical and nutritional problems.

N72-11990# Joint Publications Research Service, Washington, D.C.

EFFECT OF HYPODYNAMIA ON GAS EXCHANGE IN ANIMALS

Ye. A. Kovalenko, V. L. Popkov, E. S. Mailyan, Yu. S. Galushko, N. V. Gordeycheva, Yu. I. Kondratyev, N. A. Ilyushko, A. N. Poptapov, L. N. Grinberg, and M. A. Seydametov *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 1-8 refs

Avail: NTIS

The pathogenesis of prolonged hypokinesia was investigated. On the 120th day of hypokinesia, functional tests were performed to determine work capacity and acute hypoxia tolerance of animals. During an exposure to 60-day hypokinesia the dogs showed a decrease in gas exchange which was most clearly pronounced by the 30th day. By the end of the experiment gas exchange increased and immediately returned to a normal level after the experiment. Rats exposed to a longer hypokinesia exhibited a distinct acceleration of gas exchange and regional oxygen consumption in muscles by the 90th-100th day. Changes in the oxidative processes in tissues were found during the 30th-60th day of hypokinesia. The rats also revealed substantial weight losses due to a decrease in muscle mass and a noticeable loss in their capacity for performing muscular work. Their tolerance to an altitude test remained unchanged. Author

N72-11992# Joint Publications Research Service, Washington, D.C.

CHANGES IN THE ACTIVITY OF ASPARTATE AMINO-TRANSFERASE AND MITOCHONDRIAL MEMBRANES IN RESPONSE TO ACCELERATIONS

L. A. Rubaskina and I. D. Yertanov *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 19-26 refs

Avail: NTIS

It was found that the activity of aspartate aminotransferase in the serum of humans exposed to transverse accelerations of 12 g for 35 sec and rats centrifuged at 36 g for six minutes decreased. During exposures of lesser intensity the value increased. The changes in enzymic activity of liver homogenate fractions of animals gave evidence that aspartate aminotransferase molecules may pass from mitochondrial membranes into the blood stream during exposures to accelerations up to 25 g for six minutes and remain fixed to them during exposures up to 36 g. Author

N72-11994# Joint Publications Research Service, Washington, D.C.

STUDY OF STREPTOCOCCAL FLORA OF THE HUMAN PHARYNX IN ISOLATED HUMAN SUBJECTS

V. I. Drozdova, R. V. Petrov, and V. M. Shilov *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 35-39 refs

Avail: NTIS

Streptococcal flora transfer between subjects during a 15-day isolation was studied. Confinement in a small enclosed volume was characterized by microbial transfer from one man to another. The test subjects exhibited no significant changes in antihyaluronidase and anti-o-streptolysine titers during the experiment. Author

N72-11995# Joint Publications Research Service, Washington, D.C.

PROVIDING RADIATION FLIGHT SAFETY FOR THE SOYUZ-9 SPACESHIP CREW

Ye. I. Vorobyev, I. V. Getselev, Yu. G. Grigoryev, V. I. Yefimov, N. S. Zatsepa, Ye. Ye. Kovalev, M. D. Nikitin, V. N. Obridko, V. M. Petrov, M. V. Teltsov et al *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 40-44 refs

Avail: NTIS

The radiation monitoring activities in preparation for and during the Soyuz 9 flight are described. Solar radiation, bursts, flares, and sunspots, and cosmic ray radiation were observed. The dosimetry was performed onboard the spaceship and also by the earth satellite Molniya 1. The total dose of cosmic radiation in the spacecraft was 195 Mrad with a dose intensity of 11 Mrad/day. N.E.N.

N72-11996# Joint Publications Research Service, Washington, D.C.

RELATIONSHIP BETWEEN THE THRESHOLDS OF CUPULAR ENDOLYMPHATIC SYSTEM RESPONSE AND MANS TOLERANCE TO MOTION SICKNESS

B. I. Polyakov and A. D. Matveyev *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 45-52 refs

Avail: NTIS

Response thresholds to angular and Coriolis accelerations (as evidenced by illusory sensations and nystagmus) to 65 test subjects were compared with their tolerances to repeated exposures to Coriolis accelerations of special configuration. The correlation coefficients between the threshold of response to Coriolis accelerations as evaluated from nystagmus and tolerance to accumulated Coriolis accelerations was 0.306 ($P > 0.95$). Mean values of response thresholds of test subjects with different tolerances to accumulated Coriolis accelerations could not be reliably discriminated. The results give evidence that data on the thresholds of cupular-endolymphatic response are of low prognostic significance with respect to human motion sickness tolerance. They also indicate a need for differentiating the concepts of vestibular excitation and vestibular tolerance when making professional screenings of cosmonaut candidates. Author

N72-11997# Joint Publications Research Service, Washington, D.C.

STUDY OF SELECTIVITY IN ADAPTATION TO CORIOLIS AND LINEAR ACCELERATIONS

B. B. Bokhov, V. P. Baranova, and A. A. Guyev *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 53-58 refs

Avail: NTIS

The effect of habituation to one of three tests (including Coriolis and linear accelerations) on tolerance to the other two

was studied. The experiments revealed a nonspecific increase in tolerance to those tests to which no adjustment was acquired.

Author

N72-11998# Joint Publications Research Service, Washington, D.C.

STUDY OF OPTIC FUNCTIONS AND RETINAL CIRCULATION IN MAN EXPOSED TO COMPLEX ACCELERATIONS.
E. S. Kotova, L. A. Kitayev-Smyk, and B. V. Ustyushin *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 59-66 refs

Avail: NTIS

Retinal hemodynamics and optic functions in 30 healthy test subjects were exposed to accelerations of 12 to 72 deg/sec. The tone of retinal vessels revealed regular changes which included variations in diastolic pressure in the central artery and changes in the caliber of arteries and veins in dependence on the duration and intensity of accelerations, as well as on the level of adaptive processes. Optic functions proved to be sufficiently stable. The results show that retinal circulation, which to a certain extent reflects the state of cerebral circulation, may be used as a criterion of the effect of Coriolis accelerations on the human body.

Author

N72-11999# Joint Publications Research Service, Washington, D.C.

EFFECT OF HIGH BRIGHTNESSES ON THE RATE OF EYE ADAPTATION TO DARKNESS

V. I. Kartsev *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 67-70 refs

Avail: NTIS

The rate of adaptation of central vision of both eyes to the darkness after light exposures of various durations (1.5, 3, 6 minutes) with illumination of 20,000 to 80,000 lux was studied in four test subjects in the age group 18-30. A white barium screen illuminated by direct sunlight was used as a light source. During adaptation to the darkness the central vision response time was proportional to the quantity of illumination during disadaptation. A value of approximately 8 million lux-sec was used. Central vision response remained virtually unchanged with a further stimulus increase.

Author

N72-12000# Joint Publications Research Service, Washington, D.C.

DYNAMICS OF MINUTE BLOOD VOLUME DURING PROLONGED HYPOKINESIA AS ESTIMATED BY THE ACETYLENE METHOD

G. P. Zvonarev *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 71-76 refs

Avail: NTIS

The minute blood volume of six healthy male test subjects was studied by the Grohmann acetylene method. By the end of the bedrest experiment the minute volume had declined significantly for all the test subjects. In comparison with the test subjects who performed physical exercises during the experiment, the test subjects exposed to complete hypokinesia exhibited a greater (threefold) decrease in minute and stroke volume. The mechanism underlying the decrease in stroke volume is unrelated to pulse rate variations. It appears to be related to changes in the cardiac contraction phases, blood flow velocity and circulating blood volume. The minute volume decrease came about with a decrease in oxygen consumption in the subjects exposed to maximum hypokinesia and an increase in the arteriovenous difference in the test subjects who were allowed physical exercises.

Author

N72-12001# Joint Publications Research Service, Washington, D.C.

EXTERNAL RESPIRATION AND GAS EXCHANGE DURING A PASSIVE ORTHOSTATIC TEST

B. S. Katkovskiy *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 77-84 refs

Avail: NTIS

Most parameters of exhalation and gas exchange, which were measured during 33 orthostatic tests involving 30 minutes standing, varied significantly. Causes of hyperventilation and exhalation lag with subsequent changes of respiratory frequency and depth are discussed as factors responsible for the lack of significant changes in some external respiration parameters. The necessity of registering external respiration and gas exchange during orthostatic tests is emphasized for clarifying the mechanisms underlying the homeostasis maintained when man is in an erect position. The need for registering the CO₂ percentage content in healthy and sick people during orthostatic tests is also stressed because its drastic decline is indicative of a syncope.

Author

N72-12002# Joint Publications Research Service, Washington, D.C.

HYPODYNAMIA AND HORMONAL ACTIVITY

I. V. Fedorov *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 85-89 refs

Avail: NTIS

Data in the literature on changes in the production of hormones (corticosteroids, adrenalin, adrenocorticotrophic hormone, antidiuretic hormones, and 5-hydroxyindolacetic acid) during hypodynamia are reviewed. Potential results of changes in hormonal activity are discussed.

Author

N72-12003# Joint Publications Research Service, Washington, D.C.

ODORIMETRIC EVALUATION OF POLYMERS USED IN CONSTRUCTING ISOLATION CHAMBERS c05

O. N. Shevkun, E. I. Semenenko, Ye. I. Kosterina, and G. A. Gaziyeu *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 90-96 refs

Avail: NTIS

Methods for determining odor thresholds by dynamic and static techniques are described, and it is found that the modified static method is advantageous. Experimental data are given on odorimetric and chemical investigations of polymers and lacquer-stain coats indicating the relationship between the odor level and the concentration of toxic compounds in the gaseous phase. It is recommended that the method be used for screening polymers and selecting the materials with the best hygienic properties.

Author

N72-12004# Joint Publications Research Service, Washington, D.C.

DETERMINING MICROELEMENTS IN HUMAN FOOD RATIONS AND EXCRETA USING THE EXTRACTION METHOD

Ye. I. Pokrovskaya, O. G. Puzanova, and A. P. Tereshchenko *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 97-102 refs

Avail: NTIS

An analytical method is described which was used in studying the elimination of microelements by subjects eating a diet of dehydrated foods during a year of confinement in an isolation chamber. A mixture of hexamethylene ammonium reagents and 8-oxychinoline and a mixture of solvents, chloroform, and isobutyl alcohol were used. The optimum ratios and pH of the mixtures are given for the different trace metals.

N.E.N.

N72-12005# Joint Publications Research Service, Washington, D.C.

METHOD FOR DETERMINING SEROTONIN (5-HYDROXYTRYPTAMINE) IN THE INTACT BLOOD OF RATS
Z. S. Dolgun, S. P. Novikova, and V. S. Shashkov *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 103-105 refs

Avail: NTIS

A method is presented for determining the blood 5-HT, using acidic butanol in the first stage of extraction. A clean quartz vessel is used for collecting blood and precipitating proteins. The sensitivity of the procedure is 0.01, the accuracy is 5, and the return of the added serotonin is 94% to 98%. N.E.N.

N72-12006# Joint publications Research Service, Washington, D.C.

METHOD FOR PROCESSING MUSCLE BIOPOTENTIALS FOR INPUT INTO AN ELECTRONIC COMPUTER

V. N. Zhishko, A. A. Ignatov, V. D. Lovitskiy, B. N. Sorokin, and I. S. Shadrinsev *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 106-112 refs

Avail: NTIS

Instrumentation for isolating the most important characteristics of muscle biopotentials and representing the results in a form convenient for the computer is described. For each of the electromyograms there is an amplitude channel, a frequency channel, and a general synchronism channel. For each electromyogram (EMS) two series of impulses are obtained, one in the 10 to 300 Hz and one in the 300 to 3000 Hz range. The amplitude, frequency, and time analyses are outlined. The error in the automatic processing exceeded 3% to 5% only when there was a marked change in the EMS frequency or amplitude.

N.E.N.

N72-12007# Joint Publications Research Service, Washington, D.C.

USE OF AUTOMATIC VOLUME CONTROL IN SYSTEMS FOR REGISTERING PHYSIOLOGICAL FUNCTIONS c05

A. N. Kozlov, V. A. Degtyarev, V. G. Voloshin, and V. S. Markov *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 113-116 refs

Avail: NTIS

An automatic volume control system is described which registers complex signals with a broad frequency spectrum on an ultrasonic Doppler cardiogram. The circuitry is diagrammed and its operation is outlined. The control system is also suitable for processing phonocardiogram, sphygmogram, and other physiological signals.

N.E.N.

N72-12008# Joint Publications Research Service, Washington, D.C.

STUDY OF VESTIBULAR REACTIVITY USING A GALVANIC CURRENT

R. R. Galle and L. N. Gavrilova *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 117-123 refs

Avail: NTIS

The vestibular reactivity in humans to a galvanic current was investigated by applying discrete and increasing stimuli and constructing an excitability curve from stabilographic data. Stimuli of 0.5, 1, 2, and 4 mA were given for 1 sec duration with 3 minutes between them. The subjects stood with eyes closed and legs apart with the right leg in front of the left by a half-step. There is a direct, almost linear dependence between the mean amplitude of oscillations of the center of gravity and the strength of the stimuli during the first five seconds. The reaction of impaired stability dies out rapidly after the five seconds.

N.E.N.

N72-12009# Joint Publications Research Service, Washington, D.C.

COORDINATION STRUCTURE OF HUMAN VOLUNTARY MOVEMENTS ACCOMPANYING STIMULATION OF THE HORIZONTAL SEMICIRCULAR CANALS BY ANGULAR ACCELERATIONS

I. F. Chekirda and F. A. Solodovnik *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 124-128 refs

Avail: NTIS

The results of a photocyclogrammetric study of the coordination of voluntary movements are presented. The subjects were exposed to negative angular accelerations (by stopping a rotating seat) in the plane of the horizontal semicircular canals. The ability to perform simple motor skills during the nystagmic reaction was observed. Effects of low accelerations were negligible, but the lack of skill after strong acceleration was marked.

N.E.N.

N72-12010# Joint Publications Research Service, Washington, D.C.

MORPHOLOGICAL CHANGES IN THE CEREBRAL VASCULAR SYSTEM INDUCED BY TRANSVERSE ACCELERATIONS

T. I. Ivanova *In its Space Biol. and Med.*, vol. 5, no. 4, 1971 3 Nov. 1971 p 129-132 refs

Avail: NTIS

The morphological changes in brains of dogs subjected to transverse accelerations of 20 to 40 g on a centrifuge 4.75 m in radius are described in detail. After rotation, parts from different sections of the brain were fixed in formalin and Bouin's fluid. Paraffin sections 7 to 10 microns thick were stained with hematoxylin-eosin, chrome hematoxylin, and paraldehyde-fuchsin.

Author

N72-12011*# Research Triangle Inst., Durham, N.C.

ADVANCEMENTS IN MEDICINE FROM AEROSPACE RESEARCH

F. Thomas Wooten 19 Nov. 1971 9 p Presented at the Space for Mankind's Benefit, Huntsville, Ala., 16-19 Nov., 1971 (Contract NASw-2273)

(NASA-CR-124614) Avail: NTIS CSCL 06E

A program designed to find ways of transferring space technology to non-space medicine is discussed. The methodology used to attack the problem and several illustrative examples of the results are given.

E.H.W.

N72-12012*# Martin Marietta Corp., Denver, Colo.

EXPERIMENTAL SYSTEM FOR THE CONTROL OF SURGICALLY INDUCED INFECTIONS

20 Oct. 1971 41 p

(Contract NASw-2210)

(NASA-CR-124619; D203613-007; MCR-71-329) Avail: NTIS CSCL 06E

The results are presented of the development tests performed on the experimental system for the control of surgically induced infections. Tests were performed on the portable clean room to demonstrate assembly, collapsibility, portability and storage. Collapsing, relocating and storing within the surgery room can be accomplished in 12 minutes. The storage envelope dimensions are 1.64 m x 4.24 m x 2.62 m high. The disassembly transfer to another room, and reassembly were demonstrated. The laminar air flow velocity profile within the enclosure was measured. In the undisturbed area of the enclosure the air flow met the Federal Standard 209a requirements of 27.45 meters per minute + or - 6.10 meters per minute. Smoke tests with simulated surgery equipment and personnel in the enclosure did not.

indicate any detrimental air flow patterns. It is concluded that the system as designed will perform the functions required for its intended use. Author

N72-12013*# Techtran Corp., Glen Burnie, Md.
MEDICAL RESEARCH PERFORMED ON THE FLIGHT PROGRAM OF THE SOYUZ-TYPE SPACECRAFT

L. I. Kakurin Washington NASA Nov. 1971 103 p Transl. into ENGLISH of an unpublished manuscript, "Meditsinskiye Issledovaniya, Vypolnennyye po Programme Poletov Kosmicheskikh Korabley Tyipa Soyuz" Moscow, Acad. of Sci. /USSR/ and Min. of Health of the USSR, 1971 p 1-117 (Contract NASw-2037) (NASA-TT-F-14026) Avail: NTIS CSCL 06S

Preflight, inflight and postflight examinations and analyses of the physical condition of the crews of the Soyuz-type spacecraft indicated that the most serious problems enumerated were (1) rushing of blood to the head on insertion into orbit, (2) demineralization of bone tissue caused by weightlessness, (3) difficulty in readjusting to Earth's gravity (especially the Soyuz-9 crew), (4) definite changes in the cardiovascular system, all of which were functions of flight duration. Experiments with plant seeds and animals (turtles) are also summarized. Author

N72-12014*# Translation Consultants, Ltd., Arlington, Va.
THE UTILIZATION OF THE ACHIEVEMENTS OF SPACE MEDICINE IN THE CARE OF PUBLIC HEALTH

N. N. Gurovskiy and A. D. Yegorov Washington NASA Nov. 1971 8 p Transl. into ENGLISH from Ispolzovaniye Dostizheniy Kosmicheskoy, Meditsiny v Zdravookhraneni (Moscow), 1971 15 p (Contract NASw-2038) (NASA-TT-F-14048) Avail: NTIS CSCL 06E

The achievements of space medicine, and an overview of how they were arrived at, are discussed. Selected aspects of possible utilization of the work done in the field of space medicine in the interests of public health, and of medicine in general are presented. Emphasis is given to problems of hypokinesis, and suggestions are advanced for ways in which to cope with this modern problem. Author

N72-12015*# Texas Univ., Houston. Section of Bioengineering.
A CARDIOVASCULAR SYSTEM MODEL FOR LOWER-BODY NEGATIVE PRESSURE RESPONSE Final Report

Baker A. Mitchell, Jr. and Robert P. Giese Sep. 1971 73 p refs (Contract NAS9-11119) (NASA-CR-115243) Avail: NTIS CSCL 06P

Mathematical models used to study complex physiological control systems are discussed. Efforts were made to modify a model of the cardiovascular system for use in studying lower body negative pressure. A computer program was written which allows orderly, straightforward expansion to include exercise, metabolism (thermal stress), respiration, and other body functions. E.H.W.

N72-12016*# Techtran Corp., Glen Burnie, Md.
RELATION BETWEEN LACTIC DEHYDROGENASE AND ALPHA-HYDROXYBUTYRIC DEHYDROGENASE OF THE RED AND WHITE BLOOD CELLS

G. Vacca and C. Trovati Washington NASA Dec. 1971 10 p refs. Transl. into ENGLISH from Minerva Med. (Torino), v. 57, 1966 p 586-589 (Contract NASw-2037) (NASA-TT-F-13990) Avail: NTIS CSCL 06P

Normal human leukolysate hemolysate LDH and HBD activity was analyzed and correlated with electrophoretic studies. Lactic hydrogenase activity is predominate in the hemolysate. Electrophoresis indicates HBD chemical instability, while leukemia produces significant changes in enzyme and isozyme relationships. Author

N72-12017*# California Univ., Berkeley. Dept. of Nutritional Sciences.

THE EFFECT OF VARIABLE CALCIUM AND VERY LOW CALCIUM DIETS ON HUMAN CALCIUM METABOLISM Ph.D. Thesis. Final Report

Jen-Yih Chu 15 Sep. 1971 148 p refs (Contract NAS9-10930) (NASA-CR-115244) Avail: NTIS CSCL 06H

The effects of a very low calcium diet, with variable high and low protein intake, on the dynamics of calcium metabolism and the mechanism of calciuretics, are examined. The experiment, using male subjects, was designed to study the role of intestinal calcium absorption on urinary calcium excretion, and the rate of production of endogeneously secreted calcium in the gastrointestinal tract. The study showed an average of 70% fractional absorption rate during very low calcium intake, and that a decrease in renal tubular reabsorption of calcium is responsible for calciuretic effects of high protein intake. The study also indicates that there is a tendency to develop osteoporosis after long periods of low calcium intake, especially with a concurrent high protein intake. Author

N72-12018# Academy of Sciences (USSR), Moscow.
THE ROLE OF WATER IN THE GENESIS OF BIOLOGICAL ORGANIZATION

Yu. Ye. Pinchukov 1971 18 p refs In RUSSIAN (PR-57) Avail: NTIS

The significance of water in biochemical processes is discussed. Water's role in the abiogenic synthesis of organic molecules and in evolutionary processes in the primordial earth is considered. Interacting forces between hydrated shells of organic molecules dissolved in water are the forces which lead to segregation of the molecules in an aqueous medium. This segregation is a stage in the evolution of organic matter necessary to the formation of life on the earth. Transl. by K.P.D.

N72-12019# National Research Council of Canada, Ottawa (Ontario).

SOME EFFECTS OF IONIZING RADIATIONS ON THE DIGESTIVE SYSTEM

D. F. Ponz Piedrafita 1971 20 p refs Transl. into ENGLISH from Mem. de la Real Acad. de Cienc. y Artes de Barcelona (Spain) v. 37, no. 16, 1967 p 519-536 (NRC-TT-1498) Avail: NTIS

The basic steps leading from energy absorption to biological lesion is summarized and the principle features of radiation sickness are described. Damage to the digestive system is emphasized. Special attention is paid to the effects on the active transport capacity and the metabolism of the small intestine. Original experiments show a progressive inhibition of glucose absorption during the 5 hours following X-irradiation. After 600 r, an initial decrease is found, then an increase, later a progressive inhibition. The effects are the same with total body or abdomen irradiation, but they are not produced when the whole body except for the abdomen is irradiated. Cystamine when injected before irradiation has a very effective radioprotective action. Thirty minutes after in vitro irradiation of everted sacs of jejunum the active transport of galactose is found to be inhibited. The O₂ uptake of intestinal strips which were irradiated in vitro becomes, after 3 hours of exposure, much lower than that of the normal ones. This respiratory effect does not appear when irradiation was made in the presence of cystamine. Author

N72-12020# Department of Civil Aviation, Melbourne (Australia). Aviation Medicine Branch.

THE COLOUR VISION REQUIREMENTS OF CIVIL AIRCRAFT PILOTS

R. D. Watkins (Melbourne Univ.) May 1971 41 p refs (Aviation-Med-Memo-29) Avail: NTIS

Current international aviation standards for colours and for colour perception, and the interpretation of these standards by Australia and other countries are described. The importance of colour coding in chart and panel displays, in signal recognition and in assessment of terrain conditions is examined. The Farnsworth lantern, used by DCA at present, is a valid selection test in present circumstances. The current air traffic signal lamp filters and code might be improved. Changes to the conventional colour code and to filter specifications to permit night flying by deuteranopes are feasible in principle and probably also in practice: corresponding changes for protanopes are much more difficult. Author

N72-12021*# Scientific Translation Service, Santa Barbara, Calif.

PLASMA VOLUME AND CORPUSCLE MASS DETERMINED WITH SERUM ALBUMIN WITH I-131 AND WITH RED CORPUSCLES MARKED WITH Cr-51

Guillermo Rey, Alfredo Macchi, and Osvaldo Degrossi Washington NASA Dec. 1971 14 p refs Transl. into ENGLISH of Argentine report "Volumen Plasmático y Masa Globular Determinados con Seroalbumina con I-131 y con Globulos Rojos Marcados con Cr-51." CNEA-172 Buenos Aires, Arg. Comision Nacl. de Energia At., 1966 p 1-10 (Contract NASw-2035)

(NASA-TT-F-14070; CNEA-172) Avail: NTIS CSCL 06P

The corpuscle volume and plasma volume of 16 test subjects were determined by the chromium-51 and the S.A. I-131 methods. Results indicated that the erythrocytic mass is less in women than in men. The S.A. I-131 method was easier to perform, but not as reliable as the Cr-51 method. Author

N72-12022*# Scientific Translation Service, Santa Barbara, Calif.

ON THE DYNAMICS OF VARIOUS RHYTHMS IN THE ELECTROCORTICOGRAM OF A CAT ASLEEP AND AWAKE
T. N. Oniani, P. Molnar, and Ya. K. Badridze Washington NASA Dec. 1971 12 p refs Transl. into ENGLISH from Zh. Vysshey Nervnoi Deyatel'nosti (Moscow), v. 21, no. 1, 1971 p 128-134 (Contract NASw-2035)

(NASA-TT-F-14068) Avail: NTIS CSCL 06C

The dynamics of corticograms and subcorticograms of cats were studied at different phases of sleep and wakefulness by means of spectral analysis and the integration method. The data obtained on 16 animals in drowsy state, during presentation of a conditioned signal, and during the stimulation of the reticular formation were statistically processed. The threshold stimulation of the reticular formation (RF) in slow sleep depressed the slow rhythms (delta and alpha), as well as beta-1 waves in the auditory and visual cortex. The beta-2 rhythms did not undergo any changes. Supraliminal RF stimulation produced a more general depression of all cortical rhythms and simultaneously a behavioral arousal. Spontaneous arousal or that evoked by a conditioned signal was attended with the same EEF changes. In the hippocampus, as the stimulation increased, a general depression of all rhythms set in gradually, as well as delta and theta waves dominance. This indicates involvement of hypothalamic connections in local electrogenesis. Author

N72-12023*# Scientific Translation Service, Santa Barbara, Calif.

SOME RESULTS OF BIOTECHNICAL TESTS AND BIOLOGICAL RESEARCH "KOSMOS-368"

Ye. A. Ilin Washington NASA Dec. 1971 7 p Transl. into English of Acad. of Sci. /USSR/, Moscow conf. paper Presented at 4th Symp. on Space Biol. and Med., Prague, 6-12 Sep. 1971 (Contract NASW-2035)

(NASA-TT-F-14064) Avail: NTIS CSCL 06M

A test performed on Cosmos 368 showed that weightlessness has almost no effect on cells in a state of rest. The characteristics of equipment to conduct biological studies in prolonged space flights are defined more accurately. Author

N72-12024*# Translation Consultants, Ltd., Arlington, Va.
RELATIONSHIP BETWEEN SUBSTRATES, RESPIRATION, AND STRUCTURE OF MITOCHONDRIA IN EUGLENA GRACILIS (Z)

R. Calvayrac Washington NASA Dec. 1971 9 p refs Transl. into ENGLISH from Arch. Mikrobiol. (W. Berlin), v. 73, 1970 p 308-314 (Contract NASw-2038)

(NASA-TT-F-14017) Avail: NTIS CSCL 06A

Euglena gracilis, strain Z, was grown in synchronous culture. Carbon source used was either DL-lactic acid (L), or a mixture of L-glutamic and DL-malic acids (GM). Synchronization was obtained by transferring the cells in the exponential growth phase, at regular intervals of 3 days, to a fresh medium. Respiration (measured during a whole cell cycle of 12 hours) was 20 + or - 6 micron/H/100,000 cells on (GM) and 46 + or - 7 micron/H/million cells on (L) medium. At the same time as the increased rate of oxygen uptake on lactate medium, a giant chondriome was observed in the cells. On glutamate-malate containing medium, the size of mitochondria was normal. Author

N72-12025*# Whirlpool Corp., St. Joseph, Mich. Life Support Systems Group.

TRACER TECHNIQUES FOR URINE VOLUME DETERMINATION AND URINE COLLECTION AND SAMPLING BACK-UP SYSTEM Final Report

Ruben V. Ramirez 1 Sep. 1971 36 p (Contract NAS9-11503)

(NASA-CR-115262) Avail: NTIS CSCL 06P

The feasibility, functionality, and overall accuracy of the use of lithium were investigated as a chemical tracer in urine for providing a means of indirect determination of total urine volume by the atomic absorption spectrophotometry method. Experiments were conducted to investigate the parameters of instrumentation, tracer concentration, mixing times, and methods for incorporating the tracer material in the urine collection bag, and to refine and optimize the urine tracer technique to comply with the Skylab scheme and operational parameters of + or - 2% of volume error and + or - 1% accuracy of amount of tracer added to each container. In addition, a back-up method for urine collection and sampling system was developed and evaluated. This back-up method incorporates the tracer technique for volume determination in event of failure of the primary urine collection and preservation system. One chemical preservative was selected and evaluated as a contingency chemical preservative for the storage of urine in event of failure of the urine cooling system. Author

N72-12026# Human Engineering Labs., Aberdeen Proving Ground, Md.

SHORT TERM MEMORY: AN ANNOTATED BIBLIOGRAPHY, SUPPLEMENT 2

Dennis F. Fisher Feb. 1971 68 p refs (AD-721656) Avail: NTIS CSCL 05/10

The present bibliography represents an extension of and second supplement to Short-Term Memory: An Annotated Bibliography, August 1968. The bibliography is an alphabetical listing of authors of 198 entries with annotations. The annotations are those of the individual authors of the respective papers and are either the abstract or summary statements from the specific reference. This method of presentation was chosen in order to provide the most exact representation of the material reported. Those references included without annotation have been published without abstracts or summary or when published, they were considered too long for inclusion. Following the last entry is an alphabetical index by topic which lists the included references by their number of appearance. Author

N72-12027# Southwest Texas State Univ., San Marcos. Dept. of Biology.

EFFECTS OF RADIATIONS ON THE GENETIC SYSTEMS OF ORGANISMS IN RELATION TO THEIR PHYSICAL AND BIOCHEMICAL SYSTEMS Comprehensive Report, 1968 - 1971

Mary L. Alexander 1971 29 p refs

(Contract AT(40-1)-3844)

(ORO-3844-7) Avail: NTIS

Males of *Drosophila melanogaster* were treated with 250 kV X-rays for studies on germinal mutations induced in the germ cell cycle. Rates for complete sex-linked lethal damage induced in various germ cells were determined. Complete and mosaic lethal rates in mature sperm, spermatids, spermatocytes, and spermatogonia are discussed. Genetic characteristics of X-ray induced mosaic lethals are described. Studies on induction of mutations in *Drosophila* by DNA feeding included genetic tests for sex-linked lethals, mosaic lethals, and autosomal recessive lethals. Dose rate studies on spermatogonial cells indicated that a large amount of genetic damage was expressed in the second and not the first generation after treatment. For studies on combined chemical and radiation treatments young males were injected with ethylenimine and given 1500 R X-rays. Results for autosomal recessive lethals showed that X-rays interfered with the mutagenic effect of ethylenimine one day after injection but not after four days. NSA

N72-12028# Pennsylvania State Univ., University Park. Dept. of Biophysics.

ACTION OF IONIZING RADIATION ON SENSITIVE STRAINS OF ESCHERICHIA COLI B

Ernest C. Pollard and Anna Tilberg 1970 48 p refs

(NYO-2804-39) Avail: NTIS

The effects of anoxia and genetic strain on the gamma radiosensitivity of DNA degradation and repair in *Escherichia coli* were investigated. Possible molecular reactions involved are discussed. NSA

N72-12029# Pennsylvania State Univ., University Park. Dept. of Biophysics.

ACTION OF IONIZING RADIATION ON THE MOLECULAR BIOLOGY OF E. COLI

Ernest C. Pollard [1970] 37 p refs

(NYO-2804-38) Avail: NTIS

The effects of ionizing radiations on molecular biological functions in living cells are discussed. Results are reviewed from a series of studies on gamma radioinduced degradation of DNA in *Escherichia coli* and the rate of repair of DNA breaks. Suggestions are presented that may explain the molecular events involved in radioinduced injuries of living cells. The possibility of the involvement of various molecular biological processes is discussed. NSA

N72-12030# Hospital of the Univ. of Pennsylvania, Philadelphia. **RESEARCH ON MANAGEMENT AND CONTROL OF RESPONSE TO STRESSFUL SITUATIONS** Final Report, 1 Feb. 1969 - 31 Jan. 1971

Martin T. Orne 31 Jan. 1971 8 p refs

(Grant AF-AFOSR-0707-67; AF Proj. 9778)

(AD-727078; AFOSR-71-1984TR) Avail: NTIS CSCL 06/16

A summary is given of research which dealt with voluntary controls of EEG, heart rate, and skin resistance and their relationship to hypnotizability. Seven scientific papers and four reports to scientific meetings were produced. Author (GRA)

N72-12031# Minnesota Univ., St. Paul. Dept. of Veterinary Physiology and Pharmacology.

NEW METHODS TO STUDY THE PHYSIOLOGICAL ACTION AND MEDICATIONS WHICH ARE HAZARDS TO AEROSPACE CREW MEMBERS Final Scientific Report

Grace W. Gray Jun. 1971 66 p

(Grant AF-AFOSR-1705-69)

(AD-726654; AFOSR-71-0713-TR) Avail: NTIS CSCL 06/15

The mechanism of action of drugs such as nicotine and atropine, and the influence of altered extracellular fluid environment on physiological processes, were investigated using the intestinal tract as a model organ system. A number of intestinal preparations of varying complexity were used, including isolated intestinal segments and nerve-muscle preparations in organ baths, intra-vascularly perfused colon-pelvic nerve preparations, and unanesthetized intestinal fistula animals. By studying the influence of controlled changes in the temperature, osmolarity, gas tensions, ionic composition, and drug content of the extracellular fluid on motor responses of intestine to acetylcholine, nicotine, acute potassium deprivation, and extrinsic nerve stimulation, it was established that nicotine's predominant excitatory effect on motor function of isolated intestine differs in mechanism from the effect of acetylcholine or extrinsic motor nerve stimulation, and most closely resembles in mechanism the effect of acute potassium deprivation. Atropine was demonstrated to have significant effects on motor function of isolated intestine which were unrelated to cholinergic blockade and which were dramatically influenced by changes in extracellular fluid composition that did not affect atrophine's cholinergic blocking action. Author (GRA)

N72-12032# Naval Aerospace Medical Inst., Pensacola, Fla. **NYSTAGMUS RESPONSE DURING ROTATION ABOUT A TILTED AXIS**

Charles W. Stockwell, Gene T. Turnipseed, and Fred E. Guedry, Jr. 9 Mar. 1971 19 p refs

(MF Proj. 12.524.004)

(AD-726172; NAMRL-1129; USAARL-71-15) Avail: NTIS CSCL 06/19

A persistent horizontal nystagmus response is elicited when a man is rotated at constant velocity about an Earth-horizontal axis. This response comprises two components: a directional bias and a cyclic modulation of the bias level. Observations were made of the effects of three stimulus variables: rate of initial acceleration, rate of steady rotation, and angle of tilt of the rotation axis. Bias and cyclic modulation were affected differently by stimulus variables, especially by rate of steady rotation, suggesting the presence of two separate response mechanisms. Previous experiments indicate that both mechanisms depend upon the otolith system, although the possibility of a semicircular canal contribution remains. Thus it is reasonable to conclude that these response components provide a means of assessing the dynamics of otolith-regulated responses. Author (GRA)

N72-12033# Naval Aerospace Medical Inst., Pensacola, Fla. **NYSTAGMUS AND VISUAL PERFORMANCE DURING SINUSOIDAL STIMULATION OF THE VERTICAL SEMICIRCULAR CANALS**

Fred E. Guedry, Jr. and Alan J. Benson 10 Mar. 1971 22 p refs

(MF Proj. 12.524.004)

(AD-726173; NAMRL-1129; USAARL-71-16) Avail: NTIS CSCL 06/19

Men were positioned on their sides and oscillated sinusoidally about an Earth-vertical axis. Initially, nystagmus slow phase velocity was about equal during the forward-and backward-pitch halves of the stimulus cycle in darkness; but when subjects tracked a dimly illuminated aircraft instrument, slow phase velocity during forward pitch was about ten times that during backward pitch. Consequently, tracking errors were much greater during forward pitch. Change in luminance level from 0.01 ft-L to 1.0 ft-L produced small, statistically significant decrements in slow phase velocity and substantial improvements in tracking performance. Following this part of the experiment, nystagmus was again recorded in darkness. There was a differential decline in slow phase velocity, the slow-phase-down response showing significantly greater decline. Stimulus-response phase relations were also altered for the slow-phase-down response, but were unaltered for the slow-phase-up response. It is proposed that

interactions between eyelid and eyeball movements caused different frequencies of upbeating and downbeating nystagmus which, in turn, produced different visual suppression of slow phase velocity in the two halves of the stimulus cycle. The asymmetric visual suppression may have contributed to the asymmetric habituation of the two reactions. Author (GRA)

N72-12034# National Academy of Sciences-National Research Council, Washington, D.C.

HEARING CONSERVATION FOR SUBMARINERS

Jun. 1971 9 p

(Contract N00014-A-0244-0211; NR Proj. 140-113)

(AD-726217) Avail: NTIS CSCL 06/19

The report advises the U.S. Navy concerning hearing conservation aboard future submarines. Included are criteria for hazard, as well as suggested techniques for hearing protection, involving personal protection, environmental damping, and noise control at the source. Author (GRA)

N72-12035# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.

PATTERN RECOGNITION OF EEG TO DETERMINE LEVEL OF ALERTNESS Final Technical Progress Report, 15 May 1968 - 14 May 1971

William B. Martin Jun. 1971 33 p refs

(Contract N00014-68-C-0277; NR Proj. 144-233)

(AD-726210; DAC-60538-F) Avail: NTIS CSCL 06/19

A modified pattern recognition approach has been designed for use on a general purpose digital computer for all night epoch by epoch sleep stage scoring. Comparison with experienced human scorers indicates an overall average agreement, for five nights, of 85 percent. On the same records, the overall average agreement for the three human scorers was 91.3 percent. There are five primary programs involved in the computer classification: (1) analog-to-digital conversion; (2) spectral analysis; (3) delta measurement; (4) pattern recognition; and (5) REM logic to identify stage REM. The stages 3 and 4 classifications are assigned by the delta measurement program. The pattern recognition program consists of two decision networks which separate stage 2, awake, and stage 1 or stage REM patterns. The stage 1 vs. REM dichotomy is performed later by the REM logic program. GRA

N72-12036# State Univ. of New York at Buffalo.

HIGH PRESSURE PHYSIOLOGY Final Project Report, 1 Mwy 1959 - 30 Apr. 1971

E. H. Lanphier and Hermann Rahn Jun. 1971 15 p refs

(Contract Nonr-969(03); NR Proj. 102-511)

(AD-726206) Avail: NTIS CSCL 06/19

Results of investigations of physiological problems arising from exposure to high pressures, as in an underwater environment, are summarized. GRA

N72-12037# California Univ., Los Angeles. School of Engineering and Applied Science.

THE EFFECTS OF AIRCRAFT DYNAMICS AND PILOT PERFORMANCE ON TACTICAL WEAPON DELIVERY ACCURACY

Robert R. Rankine, Jr. Nov. 1970 226 p refs

(Grant AF-AFOSR-0699-67)

(AD-728324; UCLA-ENG-7085; AFOSR-71-2262TR) Avail: NTIS CSCL 05/10

An adequate model of piloted weapon delivery is needed in order to relate pilot tracking performance, and the aircraft dynamics which limit that performance, to the overall accuracy of tactical weapon delivery. By modeling the entire pilot-aircraft system for the air-to-ground weapon delivery task, an

understanding of the interaction and relative importance of the various elements of the system can be obtained. With this insight the designer is able to treat the correction or improvement of system deficiencies in a logical order of their importance to a specific measure of system performance. A complete model of the piloted weapon delivery task is now possible through the application of mathematical models of the human operator's performance characteristics to the dynamic description of the combined control-display-vehicle system. The approach taken is to derive a linear expression for projectile impact error in terms of the task variables which are directly under the pilot's control. A statistical model of the propagation of these pilot-induced errors into impact error is then developed by considering each of the pilot inputs to be a random variable. A method for including the effect of pilot compensation of an observed error in one of the variables with an intentional deviation in another is also introduced. An analytical model of the human pilot is used to estimate the tracking error from the controlled-element dynamics and the turbulence environment. Author (GRA)

N72-12038# Navy Experimental Diving Unit, Washington, D.C.

REPORT OF NINE FOUR HOUR EXPOSURES TO 100 PERCENT OXYGEN AT 11-13 FEET OF SEAWATER

John M. Alexander and Edward T. Flynn, Jr. 9 Aug. 1971 14 p refs

(AD-728760; NEDU-RR-9-71) Avail: NTIS CSCL 06/19

Eight healthy male subjects were exposed to 100% oxygen for four hours at a simulated depth of 11-13 feet of seawater in a wet compression chamber. No symptoms of central nervous system or pulmonary oxygen toxicity were observed. Four of the subjects, however, demonstrated decreases in vital capacity ranging from 137 to 786 ml BTPS following the exposure. These changes were believed to be due to atelectasis formation in the inert gas-free, immersed lung. Author (GRA)

N72-12039# Joint Publications Research Service, Washington, D.C.

FUTURE OF SCIENCE

V. I. Goldanskiy, V. A. Kirillin et al 29 Oct. 1971 66 p Transl. into ENGLISH from the book "Budushcheye Nauki," Intern. Ann., no. 4, Moscow, Znaniye Press, 1971 p 5-19, 118-132, 143-159, and 191-230

(JPRS-54355) Avail: NTIS

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N72-12041# Joint Publications Research Service, Washington, D.C.

SPECTRAL ANALYSIS AND CYBERNETICS

Aleksandr Filippovich Plonskiy In its Future of Sci. 29 Oct. 1971 p 12-22

Avail: NTIS

Spectral analysis is discussed with applications in general mechanics, material strength, elasticity theory, oscillation theory, hydrodynamics, aerodynamics, electricity, magnetism, radio engineering, optics, acoustics, aeronautics, and aircraft construction. An example of spectral analysis applied to electrocardiogram printouts is given. J.A.M.

N72-12043# Joint Publications Research Service, Washington, D.C.

ELECTROMAGNETIC FIELDS: NEW STIMULI

Yuriy Andreyevich Kholodov *In its Future of Sci.* 29 Oct. 1971 p 36-53

Avail: NTIS

Electromagnetic fields are classified as isolated stimuli for the brain. Stimulus paths to the brain, electromagnetic field penetration into sensitive sphere, harmful effects, electromagnetic fields as an ecologic factor, specific stimulus, and direct effects on the brain are summarized. J.A.M.

N72-12044# Joint Publications Research Service, Washington, D.C.

SIMULATION OF MEMORY

Samuil Natanovich Braynes *In its Future of Sci.* 29 Oct. 1971 p 54-66

Avail: NTIS

The theoretical field of biocybernetics is reviewed, including the general laws of controlling the self-organizing and self-regulating systems of the organism. A mathematical model is used to simulate the memory. The applied field of biological and medical cybernetics is used to derive improved methods of experimental data processing and analysis. J.A.M.

N72-12045*# General Technical Services, Inc., Upper Darby, Pa.

TO DEVELOP A SPECTRAL ANALYZER FOR PHYSIOLOGICAL AND MEDICAL USE Final Report

A. Iberall, S. Cardon, M. Weinberg, and A. Schindler Sep. 1971 21 p refs

(Contract NASw-1815)

Avail: NTIS CSCL 06B

Scientific requirements necessary to develop a spectral analyzer for monitoring mammalian subjects, are discussed. The analyzer measures dynamic or time dependent data as a measure of the subjects operating status. Measurable data include metabolic rate, body temperature, and blood constituents like glucose, oxygen, and carbon dioxide, and lactic acid. Metabolic cycles were found with periodicities in the range of minutes and hours; longer cycles in body weight (3 1/2 days and 60 days), indicative of metabolic processes, were also found.

Author

N72-12046*# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.

DEFINITION STUDY FOR AN EXTENDED MANNED TEST OF A REGENERATIVE LIFE SUPPORT SYSTEM Final Report

Nov. 1971 172 p

(Contract NAS1-10790)

(NASA-CR-112000; MDC-G-2624) Avail: NTIS CSCL 06K

A program was defined which consists of extended ground-based manned tests of regenerative life support systems. The tests are to evaluate prototypes of advanced life support systems under operational, integrated conditions, thus providing data for the design of efficient environmental control and life support systems for use in long-duration space missions. The requirements are defined for test operations to provide a simulation of an orbiting space laboratory. The features of Phase A and B programs are described. These tests use proven backup equipment to ensure successful evaluation of the advanced subsystems. A pre-tests all-systems checkout period is provided to minimize equipment problems during extended testing and to familiarize all crew and operating staff members with test equipment and procedures. Author

N72-12047*# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.

DEFINITION STUDY FOR AN EXTENDED MANNED TEST OF A REGENERATIVE LIFE SUPPORT SYSTEM, PRELIMINARY TEST PLAN

Nov. 1971 163 p

(Contract NAS1-10790)

(NASA-CR-111999; MDC-G-2625) Avail: NTIS CSCL 06K

A preliminary plan and procedure are presented for conducting an extended manned test program for a regenerative life support system. Emphasis will be placed on elements associated with long-term system operation and long-term uninterrupted crew confinement. Author

N72-12048*# General Electric Co., Philadelphia, Pa. Missile and Space Div.

HANDBOOK OF HUMAN ENGINEERING DESIGN DATA FOR REDUCED GRAVITY CONDITIONS

T. Marton, F. P. Rudek, R. A. Miller, and D. G. Norman Washington NASA Oct. 1971 536 p refs

(Contracts NAS9-8640; NAS8-18117)

(NASA-CR-1726) Avail: NTIS HC \$6.00/MF \$0.95 CSCL 06B

A Handbook is presented for the use of engineers, designers, and human factors specialists during the developmental and detailed design phases of manned spacecraft programs. Detailed and diverse quantified data on man's capabilities and tolerances for survival and productive effort in the extraterrestrial environment are provided. Quantified data and information on the space environment as well as the characteristics of the vehicular or residential environment required to support man in outer space are also given. Author

N72-12049*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

ANALYTIC EVALUATION OF DISPLAY REQUIREMENTS FOR APPROACH TO LANDING

David L. Kleinman and Sheldon Baron Washington NASA Nov. 1971 101 p refs

(NAS2-5962)

(NASA-CR-1952) Avail: NTIS CSCL 06B

A computerized analysis procedure, based on a control theoretic model of the human pilot, is used to evaluate display requirements for longitudinal control in the landing approach. The display employed a digitally generated, perspective runway image with a superimposed artificial horizon for pitch indication. System performance measures are obtained for the approach phase of a light aircraft and a DC-8; predictions are made as to the effects of several display modifications. It is found that augmenting the basic display with glide slope reference bars and a velocity aim point yields adequate performance in calm air. Under moderate turbulence, the augmented display appears to be adequate for a DC-8 approach but not for a light aircraft.

Author

N72-12050*# National Aeronautics and Space Administration, Washington, D.C.

EXPERIMENTAL BASIS OF SEVERAL METHODS OF PREVENTING UNFAVORABLE EFFECTS OF WEIGHTLESSNESS

A. M. Genin and I. D. Pestov Nov. 1971 19 p refs Transl. into ENGLISH from Akad. Nauk SSSR (Moscow), 1971 21 p Presented at the 4th Intern. Symp. on Man in Space, Yerevan, USSR, Oct. 1971

(NASA-TT-F-14027) Avail: NTIS CSCL 06S

Experiments dealing with the suitability of laboratory simulation of weightlessness in order to test various preventive measures against the unfavorable effects of weightlessness on human subjects are described. It is concluded that laboratory simulation, although not the final solution, is a step in the right direction. Author

N72-12051*# Colorado State Univ., Fort Collins.
STIMULATION OF CARDIOVASCULAR ADAPTABILITY DURING PROLONGED SPACE EXPOSURE Final Report
 Harry A. Gorman 30 Jun. 1971 66 p refs
 (Grant NGR-06-002-038; Proj. 1912)
 Avail: NTIS CSCL 06S

The deconditioning effects of weightlessness on the cardiovascular system of astronauts are discussed. It is believed that man cannot tolerate indefinite exposure to weightlessness without considerable circulatory deterioration. Analyses of data collected from space flights to date substantiate these beliefs, and confirm the fact that some form of compensation must be provided to keep the cardiovascular system of space travelers properly conditioned. Sequential pulsatile devices were investigated to produce periodic hydrostatic pressure gradients in the venous system of eight subhuman primates. Intermittent venous pooling of blood in the extremities triggers and stimulates the vascular reflex mechanisms of the cardiovascular system that may have significant benefits in maintaining the circulatory system in proper tone under weightless conditions. Electrocardiograms, blood pressure measurements, cardiac output and stroke volume determinations were used to evaluate the efficiency of the described technique. Results were amazingly consistent to indicate an efficient system for intermittently exercising the heart within safe and medically acceptable limits. Author

N72-12052*# Fairchild Hiller Corp., Farmingdale, N.Y. Republic Div.
SPACE STATION/BASE FOOD SYSTEM STUDY. VOLUME 1: SYSTEMS DESIGN HANDBOOK Final Report
 31 Dec. 1970 537 p ref
 (Contract NAS9-11139)
 (NASA-CR-115231; MS128V0010-Vol-1; MSC-01814-Vol-1)
 Avail: NTIS HC \$6.00/MF \$0.95 CSCL 06H

A description is given of the approach used in a study to identify and define engineering data for a spectrum of possible items and equipment comprising potential food systems. In addition, the material presented includes: (1) the study results containing the candidate concepts considered and technical data, performance characteristics, and sketches for each of the concepts by functional area; (2) human factors considerations for crew tasks; (3) shuttle supply interface requirements; (4) special food system study areas; and (5) recommendations and conclusions based on the study results. Author

N72-12053*# Fairchild Hiller Corp., Farmingdale, N.Y. Republic Div.
SPACE STATION/BASE FOOD SYSTEM STUDY. VOLUME 2: SYSTEM ASSESSMENTS Final Report
 31 Dec. 1970 257 p ref
 (Contract NAS9-11139)
 (NASA-CR-115229; MS128V0010-Vol-2; MSC-01814-Vol-2)
 Avail: NTIS CSCL 06H

The evaluation modeling technique is described which was used to combine the candidate element concepts into systems that meet mission requirements. Results of the assessment are presented in terms of systems performance data and plots of system trade-off data by highest ranking variable. Author

N72-12054*# Fairchild Hiller Corp., Farmingdale, N.Y. Republic Div.
SPACE STATION/BASE FOOD SYSTEM STUDY. BOOK 1: ELEMENT CONCEPT DATA SHEETS
 31 Dec. 1970 908 p ref
 (Contract NAS9-11139)
 (NASA-CR-115228; MS128W0002-Bk-1; MSC-01816-Bk-1)
 Avail: NTIS HC (individually priced)/MF \$0.95 CSCL 06H

The detail engineering data sheets are presented for all concepts considered in the final phase of the study as well as those only carried through the interim phase due to non-applicability or deleted missions. Author

N72-12055*# Fairchild Hiller Corp., Farmingdale, N.Y. Republic Div.
SPACE STATION/BASE FOOD SYSTEM STUDY. BOOK 2: SUPPORTING TECHNICAL DATA
 31 Dec. 1970 264 p ref
 (Contract NAS9-11139)
 (NASA-CR-115230; MS128W0002-Bk-2; MSC-01816-Bk-2)
 Avail: NTIS CSCL 06H

The formulae, assumptions, calculations, and supporting analyses for the element concept data sheets are given. Author

N72-12056*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
MISHAPS WITH OXYGEN IN NASA OPERATIONS
 Paul M. Ordin 1971 35 p refs Presented at the Oxygen Compressors and Pumps Symp., Atlanta, 9-11 Nov. 1971
 (NASA-TM-X-67953; E-6604) Avail: NTIS CSCL 13L

Data from a substantial number of oxygen mishaps obtained from NASA and contractor records are presented. Information from several Air Force records, concerning oxygen accidents involving aircraft operations, are also included. Descriptions of the mishaps and their causes, for both liquid and gaseous oxygen in ground test facilities and space vehicle systems, are given. A number of safety regulations aimed at reducing the accident probability is discussed. The problems related to material compatibility and materials testing are considered, and the limited information on factors affecting the ignition of materials in oxygen is presented. In addition, details are given of several of the accident/incidents listed in order to define the combination of conditions causing the mishap. In addition to propellant system mishaps, accident/incidents which occurred in space and ground system structures were included, as well as those in electrical systems, ground support facilities, ordnance, and related operations. Author

N72-12057# Joint Publications Research Service, Washington, D.C.
EXTERNAL RESPIRATION, GAS METABOLISM, AND ENERGY EXPENDITURE IN THE CASE OF VARYING HUMAN ACTIVITY UNDER CONDITIONS OF WEIGHTLESSNESS

I. I. Kasyan, G. F. Makarov, and V. I. Sokolov 16 Nov. 1971 15 p refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR, Ser. Biol. (Moscow), no. 5, 1971 p 673-681
 (JPRS-54493; CSO-1850-S) Avail: NTIS

Human external respiration, gas metabolism, and energy expenditure during performance of various tasks carried out under conditions involving brief periods of weightlessness are examined. Weightlessness was created during aircraft flights along parabolic trajectories, in a water medium, and on special floating stands. Results indicate that regardless of the way in which weightlessness was simulated, human energy expenditures on the performance of the same tasks were 22 to 42 percent higher than under ordinary conditions on the ground, both when the individuals being tested were normally dressed and when they wore special garments. A tendency was noted toward a decrease in the energy consumption rate under weightless conditions as the individuals being tested became accustomed to these conditions. It was concluded that the metabolic shifts observed are connected with the general nonspecific reaction of the organism to the influence of unusual physical factors (weightlessness), causing a disturbance of motion coordination. Author

N72-12058# Joint Publications Research Service, Washington, D.C.
TOXICOLOGICAL CHARACTERISTICS OF THE ARTIFICIAL ATMOSPHERE OF CLOSED ECOLOGICAL SYSTEMS
 V. V. Kustov and L. A. Tiunov 19 Nov. 1971 29 p refs

Transl. into ENGLISH from Russian report "Farmakol., Khioiterapevticheskiye Sredstva, Toksikol., 1969, Probl. Toksikol." Moscow, 1971 p 8-28
(JPRS-54531; CSO-1850-S) Avail: NTIS

Literature dealing with the toxicological characteristics of the artificial atmosphere of closed ecological systems (CES) was analyzed, systematized, and the prospects for the development of this branch of toxicology thoroughly examined. Investigations indicate that further research is required to: (1) thoroughly understand the chemical composition of the CES atmosphere; (2) determine how gaseous composition of the CES atmosphere is affected by the interaction process between chemical components; (3) evaluate combined effect of numerous chemical agents accumulating in the CES atmosphere; (4) determine sensitizing properties of harmful impurities contained in the atmosphere; (5) analyze acute and chronic poisoning which may occur when contamination level rises to toxic concentrations; and (6) study clinical syndromes which may develop as a result of the toxic effect of the gaseous products of man's vital activities on himself. A.L.

N72-12059*# National Aeronautics and Space Administration. Flight Research Center, Edwards, Calif.

DIGITAL AUTOMATIC DATA REDUCTION TECHNIQUES USED IN A 1000-FLIGHT BIOMEDICAL STUDY

Richard Carpenter and James Roman Dec. 1971 16 p refs
(NASA-TN-D-6601; H-651) Avail: NTIS CSCL 06S

Techniques developed to automatically process a large quantity of physiological data obtained during a 1000-flight study are described. To reduce this data reliably, a study program was conducted using physiological data from X-15 flights as a data source for experimenting with signal enhancement and noise elimination techniques. The techniques include an automatic means for counting heart rates, averaging electrocardiogram waveforms, plotting histograms of heart rate versus frequency, and counting respiration rates. These techniques were used to reduce more than 2000 hours of physiological data recorded in flight. Author

N72-12060*# Honeywell, Inc., St. Paul, Minn. Systems and Research Center.

DEVELOPMENT OF TECHNIQUES FOR MEASURING PILOT WORKLOAD

D. A. Spyker, S. P. Stackhouse, A. S. Khalafalla, and R. C. McLane Washington NASA Nov. 1971 116 p refs
(Contract NAS2-5443)
(NASA-CR-1888) Avail: NTIS CSCL 05E

An objective method of assessing information workload based on physiological measurements was developed. Information workload, or reserve capacity, was measured using a visual discrimination secondary task and subjective rating of task difficulty. The primary task was two axis (pitch and roll) tracking, and the independent variables in this study were aircraft pitch dynamics and wind gust disturbances. The study was structured to provide: (1) a sensitive, nonloading measure of reserve capacity, and (2) an unencumbering reliable measurement of the psychophysiological state. From these, a measured workload index (MWI) and physiological workload index (PWI) were extracted. An important measure of the success of this study was the degree to which the MWI and PWI agreed across the 243 randomly-presented, four-minute trials (9 subjects X 9 tasks X 3 replications). The electrophysiological data collected included vectorcardiogram, respiration, electromyogram, skin impedance, and electroencephalogram. Special computer programs were created for the analysis of each physiological variable. The digital data base then consisted of 82 physiological features for each of the 243 trials. A prediction of workload based on physiological observations was formulated as a simultaneous least-squares prediction problem. A best subset of 10 features was chosen to predict the three measures of reserve capacity. The canonical correlation coefficient was .754 with a chi squared value of 91.3 which allows rejection of the null hypothesis with p of .995.

Author

N72-12061# Civil Aeromedical Inst., Oklahoma City, Okla.
THE RELATIONSHIP BETWEEN CHRONOLOGICAL AGE AND APTITUDE TEST MEASURES OF ADVANCED LEVEL AIR TRAFFIC CONTROL TRAINEES

Bart B. Cobb, Carolyn D. Lax, and Nancy M. Bourdet Jul. 1971 35 p refs
(FAA-AM-71-36; Task-AM-C-69-PSY-5; Task-AM-A-70-PSY-23 Task-AM-B-71-PSY-23) Avail: NTIS CSCL 05I

Procedures used to select air traffic controllers are examined. Tests were made of 710 men in training ranging in age from 21 to 52 years, with less than 12% over 40. Most of the subjects were former military controllers who possessed sufficient prior ATC experience to be (a) selected for training with an exemption from a qualifying aptitude index, and (b) appointed to trainee status with higher-than-normal pay grades. Age correlated negatively with 21 of the 22 aptitude measures and with training course grades. On most tests, performance means for subjects over age 34 were significantly lower than those obtained for the younger trainees, and their attrition rate for the training course was three times that of their younger classmates. Only one of the 22 aptitude measures failed to correlate positively with the training grades. The results indicated that greater effectiveness in screening such applicants could be attained if eligibility standards were modified to include consideration of both age and aptitudes. Author

N72-12062# Melpar, Inc., Falls Church, Va.
APPLICATION OF ADAPTIVE MATHEMATICAL MODELS TO A T-37 PILOT PERFORMANCE MEASUREMENT PROBLEM Final Report, Feb. 1969 - Aug. 1970

Edward M. Connelly, Alfred R. Schuler, Francis J. Bourne, and Patricia A. Knoop (AF Human Resources Lab.) Wright-Patterson AFB, Ohio. AFHRL Jan. 1971 241 p refs
(Contract F33615-69-C-1415; AF Proj. 6114)
(AD-726632; AFHRL-TR-70-45; Rept-9050) Avail: NTIS CSCL 05/10

The report documents experimental research on a new method of deriving performance measures and criteria for use in automated pilot performance evaluation. Data recorded on board a T-37B aircraft (tail number 58-1948) were submitted to a previously implemented system of adaptive mathematical models (AMM). The results were analyzed to determine the practical capability of the AMM in automatically deriving measures and criteria. Flight data for a series of performances of the Lazy 8 and Barrel Roll maneuvers were processed first by a set of Boolean functions. These functions describe the data in the form of Boolean time sequences (BTS), which are then operated upon by the AMM to derive three types of performance measures: (1) State Transfer Measures, which are based on overall trends in the performance; (2) Absolute Measures, which are based on a comparison of actual performance with some reference; and (3) Relative Measures, which are based on relations among performance variables. The results show that the AMM system can be used to effect a systematic attack on the problems of performance measurement using representative flight data. Face-validity of measures derived by the AMM is illustrated by comparison with performance evaluations made by an instructor pilot. Author (GRA)

N72-12063# Synsis, Inc., Los Angeles, Calif.
PROTOTYPE COLD WEATHER FACE MASK

David Mangelsdorf, Samuel Tobey, Richard Colman, and Marvin Goldberg Feb. 1971 84 p refs
(Contract DAAG17-70-C-0113)
(AD-727744; USA-NLABS-TR-71-45-CE) Avail: NTIS CSCL 06/17

An improved cold weather face mask has been developed which should provide protection from cold, wind, blowing snow.

and frostbite in environments to -65F and 35 mph wind velocities. The mask provides physical compatibility with military clothing and equipment and will not occlude the field of vision. It weighs less than 2 1/2 ounces, covers the forehead, cheeks, nose, ears, chin and mouth, and is designed such that a single-size mask can adequately accommodate the U. S. Army population. Provisions are included to permit eating, smoking, relief of excess moisture accumulations, and elimination of oral and nasal body wastes. The mask is composed of a laminated insulating material facepiece, an oronasal thermal control barrier and an adjustable retention harness. The laminated material consists of a stretch nylon outer layer, a cotton jersey inner layer and an insulating interlayer. In the final configuration, mask models were produced using either a 1/4-inch polyurethane foam or a 3/8-inch polyester felt for the insulating interlayer. The laminated material has sufficient compliance and stretch to conform well to a wide range of facial contours. Author (GRA)

N72-12064# Air Force Human Resources Lab., Wright-Patterson AFB, Ohio. Advanced Systems Div.

A SYSTEMS APPROACH TO C-130E AIRCREW TRANSITIONAL TRAINING Final Report

Horace H. Valverde and Bob P. Burkett (Tactical Air Command, Little Rock AFB, Ark.) Mar. 1971 72 p refs (AF Proj. 1710)

(AD-727055; AFHRL-TR-71-4) Avail: NTIS CSCL 05/9

The report describes the development and evaluation of a Tactical Air Command (TAC) C-130E transitional aircrew training program based on a systems approach. The systems approach to training emphasizes the importance of specifying objectives derived from a task analysis of the aircrew member's job. A training program was prepared to develop proficiency in the specific duties required of the C-130E pilot, co-pilot, and the flight engineer. The training program was designed to be highly job relevant and included multimedia and self-instruction materials. Training objectives were derived from a task analysis of the C-130E aircrew members' job requirements. Aircrew flight training course materials and various training media were prepared based on the specific end-of-course objectives. The training program was evaluated over a six-month period, revised as needed, and implemented by TAC in the USAF formal school for C-130E transitional training for all military services. The results were as follows: students in the new course achieved all training objectives; classroom instruction was reduced about 50%; flying hours were reduced from 45 to 35 hours; length of training was reduced 37% per trainee; pilots and co-pilots, graduates of the new course, were rated significantly higher by their supervisors than were graduates of the old course; there was no significant difference in ratings received by the two flight engineer groups; and verified annual savings of about five million dollars was realized. Author (GRA)

N72-13010*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

THE PILOT-AIRCRAFT INTERFACE

c05

George E. Cooper *In its Vehicle Technol. for Civil Aviation* 1971 p 271-286 refs (See N72-12995 04-02)

Avail: NTIS HC \$6.00/MF \$0.95 CSCL 05E

The pilot-aircraft interface centers in the cockpit but is specifically represented by the means through which the pilot receives his information and through which he, in turn, controls or communicates with the aircraft and the environment. In any aircraft each of the pilot's channels of sensory perception is utilized in one way or another. The predominate input channel is visual. First an attempt to define the nature of the problem is made; then the state of technology in this area is briefly considered. Next, the requirements for applying this technology as well as that for assessing promising technology for application to the pilot-aircraft interface are examined. Then a review is made of the most important elements of technology which should be used during the 1970's and which will have a significant impact on the civil transport cockpit of the 1980's.

Author

N72-13050*# National Aeronautics and Space Administration. Manned Spacecraft Center, Houston, Tex.

EFFECTS OF INHALATION OF FREON 113 ON LABORATORY ANIMALS

Vernon L. Carter, Paul M. Chikos, James D. MacEwen (SysteMed Corp., Wright-Patterson AFB, Ohio), and Kenneth C. Back (AMRL, Wright-Patterson AFB, Ohio) Dec. 1970 18 p (NASA-TM-X-67461; AD-727524; AMRL-TR-70-102-20) Avail: NTIS CSCL 06T

Four monkeys, 8 dogs, 40 mice, and 50 rats were exposed continuously to 2000 ppm Freon 113 in a Thomas Dome for 14 days. This exposure produced no mortalities nor adverse symptomatology. There were no significant alterations in hematological values, clinical chemistries, electroencephalographic findings, body weights, or organ to body weight ratios. The effect of 2% Freon 113 on nicotinic transmission through the stellate ganglion of the spinal dog was also evaluated. The exposure induced a reduction in nicotinic transmission comparable to 2% halothane. Author

N72-13051*# Biospherics, Inc., Rockville, Md.

AUTOMATED MICROBIAL METABOLISM LABORATORY Annual Report, 1971

19 Oct. 1971 134 p refs

(Contract NASw-1931)

(NASA-CR-124691) Avail: NTIS CSCL 14B

The effect of several environmental parameters on previously developed life detection systems is explored. Initial attempts were made to conduct all the experiments in a moist mode (high soil volume to water volume ratio). However, only labeled release and measurement of ATP were found to be feasible under conditions of low moisture. Therefore, these two life detection experiments were used for most of the environmental effects studies. Three soils, Mojave (California desert), Wyaconda (Maryland, sandy loam) and Victoria Valley (Antarctic desert) were generally used throughout. The environmental conditions studied included: incubation temperature 3 C to 80 C, ultraviolet irradiation of soils, variations in soil/liquid ratio, specific atmospheric gases, various antimetabolites, specific substrates, and variation in pH. An experiment designed to monitor nitrogen metabolism was also investigated. Author

N72-13052# Academy of Sciences (USSR), Moscow.

METHODS OF SEPARATING BIOLOGICALLY IMPORTANT UNITS FROM THE ORGANIC MATTER IN SOILS

G. A. Lavrentyev 1971 34 p refs In RUSSIAN

(PR-60) Avail: NTIS

Organic materials in soils were studied for C, N, and P content. Solutions of Na4P2O7, Na3PO4, HCl, Na2CO3, NaOH, HF, and EDTA-Na2 were used for the extractions of various organic elements. The effectiveness of the different reagents in removal of the amino acids glycine, aspartic acid, valine, leucine, alanine, glutamic acid, and treonine was investigated. Nucleic acids, nucleotides, xanthine, hypoxanthine, and various enzymes, as well as DNA and RNA, were also considered. It was concluded that the effectiveness of extraction was directly proportional to the pH and the complex-forming ability of the ions in the extracting reagent. Transl. by K.P.D.

N72-13053*# Michigan Univ., Ann Arbor. Research Center for Group Dynamics.

ORGANIZATIONAL STRESS AND INDIVIDUAL STRAIN: A SOCIAL-PSYCHOLOGICAL STUDY OF RISK FACTORS IN CORONARY HEART DISEASE AMONG ADMINISTRATORS, ENGINEERS, AND SCIENTISTS Cumulative Progress Report, 1 Jul. 1969 - 30 Jun. 1970

Robert Dennis Caplan Nov. 1971 691 p refs

(Grant NGR-23-005-185)

(NASA-CR-125217) Avail: NTIS HC \$9.00/MF \$0.95 CSCL 06S

It is hypothesized that organizational stresses, such as high quantitative work load, responsibility for persons, poor relations with role senders, and contact with alien organizational territories, may be associated with high levels of psychological and physiological strain which are risk factors in coronary heart disease. It is further hypothesized that persons with coronary-prone Type A personality characteristics are most likely to exhibit strain under conditions of organizational stress. Measures of these stresses, personality traits, and strains were obtained from 205 male NASA administrators, engineers, and scientists. Type A personality measures included sense of time urgency, persistence, involved striving, leadership, and preference for competitive and environmentally overburdening situations.

Author

N72-13054# Royal Aircraft Establishment, Farnborough (England).

DELAYED REACTIONS IN HUMANS

Ziemowit Wlodarski Jan. 1971 21 p refs Transl. into ENGLISH from Przegl. Psychologiczny (Poland), no. 2, 1958 p 57-69

(RAE-Lib-Tran-1498; BR25162) Avail: NTIS

Experiments involving enforced delay of response to stimuli in a choice situation are widely used in research on memory and higher mental processes. At the time that the response is actually made the stimuli are no longer present. A number of research findings are reviewed. The success of the response following delay depends on a great variety of factors including length of delay, species and stage of development of the subject and presence of mediating cues, e.g. color. For human adults and older children the amount of tolerable delay may be regarded as unlimited.

Author

N72-13055*# Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.

THE MEASUREMENT OF RADIATION EXPOSURE OF ASTRONAUTS BY RADIOCHEMICAL TECHNIQUES

Quarterly Research Report, 4 Jan. - 4 Apr. 1971

R. L. Brodzinski 15 Apr. 1971 45 p refs Sponsored by NASA

(Contract AT(45-1)-1830)

(NASA-CR-124713; BNWL-1183-8) Avail: NTIS CSCL 06R

The concentrations of 23 major, minor, and trace elements in the fecal samples from the Apollo 12 and 13 astronauts are reported. Most elemental excretion rates are comparable to rates reported for earlier missions. Exceptions are noted for calcium, iron, and tin. Body calcium and iron losses appear to be reduced during the Apollo 12 and 13 missions such that losses now seem to be insignificant. Refined measurements of tin excretion rates agree with normal dietary intakes. Earlier reported tin values are in error. A new passive dosimetry canister was designed which contains foils of tantalum, copper, titanium, iron, cobalt, aluminum, and scandium. By measuring the concentrations of the various products of nuclear reactions in these metals after space exposure, the characteristics of the incident cosmic particles can be determined.

Author

N72-13056*# ABT Associates, Inc., Cambridge, Mass.

APPLICATIONS OF AEROSPACE TECHNOLOGY IN BIOMEDICINE. A TECHNOLOGY TRANSFER PROFILE: PATIENT MONITORING

Donald M. Murray Sep. 1971 36 p refs

(Contract NASw-2022)

(NASA-CR-124817) Avail: NTIS CSCL 06E

NASA contributions to cardiovascular monitoring are described along with innovations in intracardiac blood pressure monitoring. A brief overview of the process of NASA technology transfer in patient monitoring is presented and a list of bioinstrumentation tech briefs and the number of requests for technical support is included.

F.O.S.

N72-13057*# John B. Pierce Foundation of Connecticut, New Haven.

DEVELOPMENT OF MATHEMATICAL MODELS OF ENVIRONMENTAL PHYSIOLOGY Final Report

Jan A. J. Stolwijk, John W. Mitchell, and Ethan R. Nadel [1971] 173 p refs

(Contract NAS9-9531)

(NASA-CR-115268; FR-B) Avail: NTIS CSCL 06P

Selected articles concerned with mathematical or simulation models of human thermoregulation are presented. The articles presented include: (1) development and use of simulation models in medicine, (2) model of cardio-vascular adjustments during exercise, (3) effective temperature scale based on simple model of human physiological regulatory response, (4) behavioral approach to thermoregulatory set point during exercise, and (5) importance of skin temperature in sweat regulation.

F.O.S.

N72-13058*# Beckman Instruments, Inc., Fullerton, Calif. Advanced Technology Operations.

PROTOTYPE SLIDE STAINER Final Report

Aug. 1971 65 p

(Contract NAS9-11929)

(NASA-CR-115264; FR-1086-101) Avail: NTIS CSCL 06M

The prototype slide staining system capable of performing both one-component Wright's staining of blood smears and eight-step Gram staining of heat fixed slides of microorganisms is described. Attention was given to liquid containment, waste handling, absence of contamination from previous staining, and stability of the staining reagents. The unit is self-contained, capable of independent operation under one- or zero-g conditions, and compatible with Skylab A.

Author

N72-13059*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

BIBLIOGRAPHY: CODES, STANDARDS, PROCEDURES, SPECIFICATIONS AND REPORTS RELATING TO CONTAMINATION CONTROL

Francis N. Ledoux Jun. 1970 54 p refs

(NASA-TM-X-63982; X-723-70-220) Avail: NTIS CSCL 11K

The bibliography is arranged in separate sections under headings that include: (1) spacecraft cleanliness, (2) general cleaning, (3) clean room and work stations, (4) contamination, (5) decontamination, (6) manufacturing, (7) miscellaneous, (8) particle count analysis, (9) passivation, (10) packaging, (11) water, and (12) acids and detergents.

D.L.G.

N72-13060*# SysMed Corp., Dayton, Ohio.

TOXIC HAZARDS RESEARCH UNIT Annual Technical Report, Jun. 1970 - May 1971

J. D. MacEwen and E. H. Vernot Wright-Patterson AFB, Ohio AMRL Oct. 1971 29 p refs

(NASA Order T-80498; Contract F33615-70-C-1046)

(NASA-CR-124835; Task-01; ATR-7: W-71004;

AMRL-TR-71-83) Avail: NTIS CSCL 06T

The activities of the Toxic Hazards Research Unit (THRU) for the period of June 1970 through May 1971 reviewed. Modification of the animal exposure facilities primarily for improved human safety but also for experimental integrity and continuity are discussed. Acute toxicity experiments were conducted on hydrogen fluoride (HF), hydrogen chloride (HCl), nitrogen dioxide (NO₂), and hydrogen cyanide (HCN) both singly and in combination with carbon dioxide (CO). Additional acute toxicity experiments were conducted on oxygen difluoride (OF₂) and chlorine pentafluoride (ClF₅). Subacute toxicity studies were conducted on methylisobutylketone and dichloromethane (methylene dichloride). The interim results of further chronic toxicity experiments on monomethylhydrazine (MMH) are also described.

Author

N72-13061# Civil Aeromedical Inst., Oklahoma City, Okla.
THE ACUTE TOXICITY OF BRIEF EXPOSURES TO HF, HC1, NO2 AND HCN SINGLY AND IN COMBINATION WITH CO

E. Arnold Higgins, Vincent Fiorica, A. A. Thomas (AMRL), and Harvey V. Davis (Standard Oil Co., Chicago) Nov. 1971 10 p refs

(Contract Dot-1AC-60027-D)

(FAA-AM-71-41; Task-AM-B-71-PHY-41) Avail: NTIS

Experiments were conducted with animals to determine the toxic effect of short-term exposures to some of the products produced in aircraft fires. The products were tested both singly and in combination with carbon monoxide. The studies show the toxicity rankings of the four materials tested to be HNC, NO2, HF and HC1, in decreasing order. Carbon monoxide concentrations which alone are not hazardous to life do not enhance the toxic response to these substances. Author

N72-13062*# Translation Consultants, Ltd., Arlington, Va.
GLYCOLYSIS IN ADENOVIRUS INFECTED RAT CELL CULTURES AND IN ADENOVIRUS TYPE 12 INDUCED HAMSTER SARCOMA CELLS

A. I. Ageyenko, N. M. Kholmukhamedova, V. T. Rimofeyev, I. Ya. Kogan, and A. N. Saprin Washington NASA Dec. 1971 9 p refs Transl. into ENGLISH of "Glikoliz Krysnykh Kulitir, Zarazhennykh Adenovirusom, i Kletok Sarkom A-12 Khomyakov", Vop. Onkol. (USSR), v. 16, no. 9, 1970 p 49-53

(Contract NASw-2038)

(NASA-TT-F-14061) Avail: NTIS CSCL 06P

It was demonstrated that in cultures of fibroblasts of rat embryos (REF) infected with human adenoviruses, statistically reliable ($p > 0.00$) increase of glycolytic reactions in contrast with the control, depending on types of inoculated viruses were observed. Cultures of REF cells, infected with oncogenic adenovirus, type 12, were characterized by more pronounced aerobic and anaerobic glycolysis than REF cultures infected with adenovirus, types 3 and 6. Cells of rat fibroblasts infected with human, adenovirus utilize glucose under aerobic conditions more intensively in comparison with control ones. There were noted identical shifts in glycolytic reactions in REF cell cultures infected with adenovirus, type 12, and in cells of hamster sarcoma A-12 cultivated in vitro. Author

N72-13063# Oak Ridge Associated Universities, Tenn. Medical Div.

[BIOMEDICAL RESEARCH ON RADIATION EFFECTS]
Research Report, Year Ending 31 Dec. 1970

31 Dec. 1970 216 p refs Sponsored by AEC

(ORAU-113) Avail: NTIS

The effectiveness of radioisotope scanning of Ga-67 for the localization of neoplasms in lymphatic tissues was evaluated. The uptake of Ga-67 in human tissues obtained at autopsy and in 22 different types of rat, hamster, and mouse tumors was studied. The radiation dose to human spleen, kidneys, adrenal glands, bone marrow, and liver at various times following the administration of tracer doses of Ga-67 was measured. The development of computer data analysis and recording systems for the analysis and storage of information of effects of whole-body irradiation on man and for the analysis of data from clinical radioisotope diagnostic tests is discussed. NSA

N72-13064# United Kingdom Atomic Energy Authority, Harwell (England).

HEALTH PHYSICS AND MEDICAL DIVISION Progress Report, Jan. - Dec. 1970

J. E. Johnston, ed. May 1971 66 p refs

(AERE-PR/HPM-15) Avail: AEC Depository Libraries; HMSO 55p; PHI \$2.35

Research projects reported include, (1) aerosol research, (2) human metabolic studies; (3) whole-body counting, (4)

occupational hygiene, (5) collaborative work with medical research laboratories, (6) operational techniques in radiation protection, (7) atmospheric pollution, (8) radiation physics, (9) neutron dosimetry and radiobiophysics, (10) personnel dosimetry service, (11) cellular radiobiology, (12) radiation spectrometry and computer processing, (13) fallout, (14) environmental analysis, (15) soil radioecology, and (16) biological applications of radiation processing and radiology. A list of 71 papers and reports issued during the year is included. NSA

N72-13065# Air Force Academy, Colo.

CROSS-SENSORY EFFECTS OF WHITE NOISE ON COLOR PERCEPTION

Lloyd R. Chason and Gene A. Berry May 1971 26 p refs

(AD-728199; USAFA-RR-71-6) Avail: NTIS CSCL 06/16

The perceived intensity of red, green and blue lights was measured under conditions of dark-adaptation or nondark-adaptation and silence or 100 dB white noise. Sixty male subjects were randomly assigned over twelve experimental cells and required to match a colored light to a white standard. No significant differences were found between dark-adaptation and nondark-adaptation. Significant differences were found between the silence and noise conditions ($p < .01$) and between the three colors ($p < .001$). Light sensitivity or perceived intensity was increased under the white noise conditions. The data are viewed as supporting theories of sensory interaction stressing the importance of considering vision and hearing as interactive systems. Possible implications in human engineering design and subsequent research efforts are discussed. Author (GRA)

N72-13066# Pennsylvania Univ., Philadelphia. School of Medicine.

HISTOPATHOLOGY OF ARGON LASER-INDUCED RETINAL LESIONS Annual Progress Report, 1 Aug. 1970 - 31 Jul. 1971

Myron Yanoff Aug. 1971 10 p refs

(Contract DADA17-70-C-0011)

(AD-728333; APR-2) Avail: NTIS CSCL 06/5

The purpose of the project was to obtain information on the biologic effects of the argon laser on the retina. In addition, the biological retinal effects of other lasers (ruby, gallium arsenide, neodymium and carbon dioxide) were carried out. After owl and rhesus monkeys were exposed to one or more of the above lasers, serial sections were cut with a microtome through the suspect retinal areas in order to determine the presence or absence of retinal damage. The pigment epithelium was the most sensitive area of the retina exposed to threshold argon and ruby laser energies. The photoreceptor and outer nuclear layers were the next most sensitive retinal areas exposed to argon radiation. Author (GRA)

N72-13067# Naval Medical Research Inst., Bethesda, Md.

A RADIOGRAPHIC METHOD FOR DEMONSTRATING DECOMPRESSION SICKNESS IN HAMSTERS

Wesley D. Ulrich, Benjamin E. Smith, Jr., and Thomas Hernandez 13 Jul. 1971 10 p

(AD-728396; NAVMED-M4306.01-1010BXX9-1) Avail: NTIS CSCL 06/19

The major vessels of the hind legs of male golden hamsters were examined with contrast angiography and air infusion angiography. The angiograms were compared with the intravascular gas patterns that were present on radiographs of hamsters with severe decompression sickness. Author (GRA)

N72-13068# Ballistic Research Labs., Aberdeen Proving Ground, Md. Nuclear Effects Lab.

VEGETATION DENSITY DETERMINATIONS BY GAMMA RAY ABSORPTION

Carmen M. Cialella and James G. Dante Jun. 1971 32 p ref (AMCMS Proj. 5872.15.39800) (AD-729319; BRL-MR-2101) Avail: NTIS CSCL 06/3

A method of nondestructive determination of vegetation density in place is presented. This method utilizes a gamma ray absorption technique. The 122 keV gamma rays from Cobalt 57 were used for this work. The determinations are made using the principle of narrow beam absorption, observing the attenuation of the gamma ray photopeak produced in a 7.62 cm dia. x 7.62 cm long sodium-iodide scintillation crystal. Results of measurements performed at Eglin Air Force Base are included.

Author (GRA)

N72-13069# Naval Medical Research Inst., Bethesda, Md. ANALYSIS OF THE PHYSIOLOGIC EFFECTS OF MICRO-WAVE RADIATION Interim Report

Byron D. McLees and Edward D. Finch Jun. 1971 74 p refs (AD-728397; NAVMED-MF12.524.015-0001B; Rept-3) Avail: MTIS CSCL 06/18

An analysis of studies on the physiologic effects of animal exposure to microwave radiation is presented. Topics include: Electromagnetic waves as they interact with tissue; Technique of microwave irradiation and evaluation of exposure; Temperature changes induced by microwave radiation; Hematologic effects; Serologic changes; Changes in testicular structure and function; The effects of microwave radiation on the eye. GRA

N72-13070*# Fairchild Hiller Corp., Farmingdale, N.Y. Republic Div.

DATA BOOK: SPACE STATION/BASE FOOD SYSTEM STUDY. BOOK 3: STUDY SELECTION RATIONALE SHEETS

31 Dec. 1970 193 p (Contract NAS9-11139) (NASA-CR-115232; MS128W0002-Bk-3; MSC-01816) Avail: NTIS CSCL 5C

The supporting rationale sheets are presented which were utilized in the selection and support of the concepts considered in the final phase of the study. Each concept, conceived to fulfill a specific function of the food system, was assessed in terms of the eight critical factors depicted on the rationale sheet. When weighted and totaled, the resulting selection factor was used as a guide in making the final decision. D.L.G.

N72-13071*# ABT Associates, Inc., Cambridge, Mass. APPLICATIONS OF AEROSPACE TECHNOLOGY IN INDUSTRY. A TECHNOLOGY TRANSFER PROFILE: FOOD TECHNOLOGY

Donald M. Murray Sep. 1971 56 p refs (Contract NASw-2022) (NASA-CR-124815) Avail: NTIS CSCL 06H

Food processing and preservation technologies are reviewed, expected technological advances are considered including processing and market factors. NASA contributions to food technology and nutrition are presented with examples of transfer from NASA to industry. F.O.S.

N72-13072*# Litton Systems, Inc., Beverly Hills, Calif. Applied Technology Div.

DEVELOPMENT OF A PORTABLE LIFE SUPPORT SYSTEM AND EMERGENCY LIFE SUPPORT PACK Final Report

13 Jun. 1970 112 p (Contract NAS9-8135; Contract NAS9-8135) (NASA-CR-108541; Publ-70-586; Publ-70-586) Avail: NTIS CSCL 06K

The design, development, and fabrication of a feasibility model of a breathing bag life support system for extravehicular

activity are discussed. The breathing vest and back pack portable life support system contains connectors which allow external water and gas supply. At a metabolic rate of 2000 BTU per hour, the two low pressure bottles provide 27 minutes of breathing gas for a total filled system weight of 30.5 pounds.

Author

N72-13073# Joint Publications Research Service, Washington, D.C.

MEANS OF PENETRATING THE OCEAN

Genrikh Uovich Zaltsman 23 Dec. 1971 21 p refs Transl. into ENGLISH from Priroda (Moscow), no. 10, 1971 p 28-37 (JPRS-54789; UDC-557.4) Avail: NTIS

The physiological effects and limitations imposed on human subjects during deep water diving are discussed. Methods for preventing adverse effects by improved protective clothing and various gas mixtures for breathing are presented. The subject of saturation diving and living at great depths for extended periods of time is examined. A brief history of scientific expeditions by various countries to increase understanding of underwater physiology is included. P.N.F.

N72-13074*# International Business Machines Corp., Huntsville, Ala. Electronics Systems Center.

A GUIDE TO ONBOARD CHECKOUT. VOLUME 2: ENVIRONMENTAL CONTROL AND LIFE SUPPORT

Sep. 1971 63 p (Contract NAS9-11189) (NASA-CR-115260; IBM-71W-00309-Vol-2) Avail: NTIS CSCL 06B

A description of space station equipment for environmental control and life support is presented. Reliability and maintenance procedures are reviewed. Failure analysis and checkout tests are discussed. The strategy for software checkout is noted. K.P.D.

N72-13075*# Martin Marietta Corp., Denver, Colo. EXPERIMENTAL SYSTEM FOR THE CONTROL OF SURGICALLY INDUCED INFECTIONS

M. D. Tevebaugh 1 Oct. 1971 32 p (Contract NASw-2210) (NASA-CR-124762; D203613-006; MCR-71-328) Avail: NTIS CSCL 06L

The development tests to be performed on the experimental system are described in detail. The test equipment, conditions, and procedures are given. The portable clean room tests include assembly, collapsability, portability, and storage; laminar flow rate; static pressure; air flow pattern; and electrostatic buildup. The other tests are on the ventilation system, human factors evaluation, electrical subsystem, and material compatibility. N.E.N.

N72-13076# Joint Publications Research Service, Washington, D.C.

TRAINING OF ASTRONAUTS ON LABORATORY AIRCRAFT UNDER CONDITIONS OF WEIGHTLESSNESS FOR LABOR ACTIVITY IN SPACE

Ye. V. Khrunov, I. F. Chekirda, and I. A. Kolosov 8 Dec. 1971 10 p refs Transl. into ENGLISH from Vopr. Psikhologii (Moscow), no. 5, 1971 p 30-36 (JPRS-54649) Avail: NTIS

The special training of astronauts in aircraft flight for later IVA and EVA in space is described. The general training procedures and the particular procedures during the final training stages are discussed. The complex activity of the astronaut as investigator and tester and the effect of performing activities in weightlessness environments are considered for evaluating the types of labor according to difficulty and reliability of astronaut performance. The change in motor skills under weightlessness conditions, and the engineering/psychological evaluation of astronaut activity are also discussed. N.E.N.

N72-13077*# Webb Associates, Yellow Springs, Ohio.
DEVELOPMENT OF A SPACE ACTIVITY SUIT
 James F. Annis and Paul Webb Washington NASA Nov. 1971
 138 p refs
 (Contract NAS1-8018)
 (NASA-CR-1892) Avail: NTIS CSCL 05E

The development of a series of prototype space activity suit (SAS) assemblies is discussed. The SAS is a new type of pressure suit designed especially for extravehicular activity. It consists of a set of carefully tailored elastic fabric garments which have been engineered to supply sufficient counterpressure to the body to permit subjects to breath O₂ at pressures up to 200 mm Hg without circulatory difficulty. A closed, positive pressure breathing system (PPBS) and a full bubble helmet were also developed to complete the system. The ultimate goal of the SAS is to improve the range of activity and decrease the energy cost of work associated with wearing conventional gas filled pressure suits. Results are presented from both laboratory (1 atmosphere) and altitude chamber tests with subjects wearing various SAS assemblies. In laboratory tests lasting up to three hours, the SAS was worn while subjects breathed O₂ at pressures up to 170 mm Hg without developing physiological problems. The only physiological symptoms apparent were a moderate tachycardia related to breathing pressures above 130 mm Hg, and a small collection of edema fluid in the hands. Both problems were considered to be related to areas of under-pressurization by the garments. These problems, it is suggested, can ultimately be corrected by the development of new elastic fabrics and tailoring techniques. Energy cost of activity, and mobility and dexterity of subjects in the SAS, were found to be superior to those in comparable tests on subjects in full pressure suits. Author

N72-13078*# Naval Air Development Center, Johnsville, Pa.
DETERMINATION OF SKIN TEMPERATURE UNDER A COMFORT-CONTROLLED LIQUID-COOLED GARMENT IN EXERCISING SUBJECTS Final Report
 L. J. SantaMaria 26 Oct. 1971 17 p refs
 (NASA Order T-91349)
 (NASA-CR-115295; NADC-CS-7118) Avail: NTIS CSCL 05E

The physiological responses of exercising subjects were investigated under conditions in which the temperature of the coolant water was varied according to the subjective state of thermal comfort. Conditioning water was maintained at a constant flow rate of 240 lb/hr and at a temperature controllable within the range of 45 to 90 F. In addition to skin temperatures, rectal temperature and heart rate were monitored in the course of each trial. Total and evaporative weight losses were determined by measurements before and after each test. The levels on xetabolic loading, measured indirectly on the basis of O₂ consumption in the course of treadmill activity, ranged from the resting state to 2000 BTU/hr at increments of about 400 BTU. Under the experimental conditions, six volunteer subjects established a level of thermal comfort, as sensed subjectively, by controlling inlet water within the available range of temperature. Author

N72-13079# Royal Aircraft Establishment, Farnborough (England).
THE EFFECT OF DAZZLE ON ELECTRONIC DISPLAY VISIBILITY IN MODERN HIGH-PERFORMANCE AIRCRAFT COCKPITS, A SUMMARY
 Q. Jainski Mar. 1971 28 p Transl. into ENGLISH from Einfluss der Blendung auf das Erkennen Elektronischer Anzeigen in Kanzeln Moderner Hochleistungsflugzeuge. Kurzfassung; German Federal Ministry Defence report T-808-I-203
 (RAE-LIB-TRANS-1545; T-808-I-203) Avail: NTIS

Data are presented for various effects on threshold light intensity. A dazzle formula is developed. K.P.D.

N72-13080*# McDonnell-Douglas Astronautics Co., St. Louis, Mo.
CREW INTERFACE DEFINITION STUDY, PHASE 1 Pre-simulation Report
 J. C. Callihan, J. W. Kraemer, and J. A. Alles 1 Oct. 1971
 150 p refs
 (Contract NAS9-12079)
 (NASA-CR-124739; MDC-E0484) Avail: NTIS CSCL 05E

The tixeline analysis of the Shuttle orbiter missions which was conducted in the Phase I Crew Interface Definition Study and the requirements for the man-in-the-loop simulation study are presented. Mission definitions and objectives are presented as they relate to various Shuttle Orbiter missions. The requirements for crew participation and the information required by the crew are discussed, and finally the rationale behind the display concept and calling procedures is given. The simulation objectives, the simulation mechanization, including a detailed presentation of the display and control concept, the simulator test plan and the results are discussed. Author

N72-13081*# Northrop Nortronics, Palos Verdes Peninsula, Calif.
METHOD OF MAKING DRY ELECTRODES Patent Application
 Frank B. Ramme, inventor (to NASA) Filed 7 Oct. 1970 13 p
 (Contract NAS4-1133)
 (NASA-Case-FRC-10029-2; US-Patent-Appl-SN-78704) Avail: NTIS CSCL 06D

Dry electrodes useful for attachment to individuals are made by mixing silver powder with a cement. The mixture is diluted with a suitable solvent for the cement and then applied in a thin layer to a surface from which it is removed as a film when dry. A wire lead is then placed on a cut film piece and a small amount of solvent is applied to the film surface where the wire rests. Subsequent pressing of a second piece of the dried film onto the substrate holding the wire forms the finished electrode. NASA

N72-13082# National Aviation Facilities Experimental Center, Atlantic City, N.J.
REACTIONS OF PILOTS TO WARNING SYSTEMS FOR VISUAL COLLISION AVOIDANCE Final Report, Jul. 1969 - Jul. 1971
 Paul M. Rich, Warren G. Crook, Richard L. Sulzer, and Peter R. Hill Dec. 1971 72 p refs
 (Proj. 051-241-03x)

(FAA-NA-71-54; FAA-RD-71-61) Avail: NTIS
 A series of six experiments was conducted that have application to the development of pilot warning instruments (PWI). The experiments were concerned with: (1) the effect of warning rates on pilot performance, (2) pilot response to imminent collision threats, (3) the evaluation of scanning patterns, (4) the value of warning-only, (5) the effect of relative motion on pilot performance, and (6) the effect of PWI display sector size. The results of these experiments offer a variety of useful data in the area of visual collision avoidance. Author

N72-13083*# Battelle Memorial Inst., Richland, Wash. Pacific Northwest Labs.
THE MEASUREMENT OF RADIATION EXPOSURE OF ASTRONAUTS BY RADIOCHEMICAL TECHNIQUES Quarterly Research Report, 5 Oct. 1970 - 3 Jan. 1971
 R. L. Brodzinski 15 Jan. 1971 39 p refs Sponsored by NASA
 (NASA-CR-124838; BNWL-1183-7) Avail: NTIS CSCL 06R

Gamma analyses of the neutron-activated fecal samples from the Apollo 12 and 13 missions were completed, and the data are being evaluated. Samples of the exposed Apollo 12

solar wind composition foil and blank foils were obtained for analysis of the Po-210 (Pb-210, Rn-222) content. It is expected that the determination of the Po-210 content of these foils will yield the concentration of radon atoms incident on the foil while exposed to the lunar atmosphere, and this indirectly will permit an estimate of the average uranium concentration of the lunar surface. Proposals to measure the cosmic-ray intensity and energy spectra inside and outside of late Apollo and Project Skylab spacecraft by exposing and subsequently analyzing pure metal foils, and to measure the elemental mass balance in Project Skylab astronauts by instrumental neutron activation analysis of the intake and excreta are summarized.

Author (NSA)

N72-13084# Glasgow Univ. (Scotland). Dept. of Aeronautics and Fluid Mechanics.

SIMULATION OF RENDEZVOUS OF A MAN IN DEEP SPACE M.S. Thesis

Daniel Pablo Mendez Mar. 1971 130 p refs Sponsored in part by ESRO

Avail: NTIS

The rendezvous in deep space with his mother ship of an isolated astronaut using a self-maneuvering booster unit is studied by means of analog and digital simulation to determine major influences. The analog computer was used to represent the mother ship and stellar background, providing insight into the maneuver and astronaut performance. The digital computer simulated human behavior in various circumstances. Obtaining an optimum value for booster thrust which minimizes fuel consumption was of great importance.

ESRO

N72-13085# Ohio State Univ., Columbus. Dept. of Electrical Engineering.

IMPROVED TECHNIQUES FOR THE CONTROL OF REMOTE DEVICES Final Scientific Report

Robert B. McGhee 10 Mar. 1971 7 p refs

(Grant AF-AFOSR-1901-70; AF Proj. 9769)

(AD-728214; AFOSR-71-2175TR) Avail: NTIS CSCL 06/2

Two major aspects of remote device control were investigated: locomotion and visual sensing. The remote device locomotion studies carried out under this grant have been aimed at the development of a theoretical understanding of the principles of legged vehicle design. It has long been recognized that the versatility of human beings in the extraction of relevant information from visual (optical) images far exceeds that of any machine. Yet, in particular circumstances, such as the reading of fixed font printed material, it has been possible to design special purpose processors with performance characteristics superior to those of humans. Recognizing this fact, the goal of this aspect of the present research program has been to attempt to devise automatic pictorial pattern recognition schemes comparable effective to character recognizers, but capable of operating in a less well controlled environment.

Author (GRA)

N72-13086# Army Aeromedical Research Lab., Fort Rucker, Ala.

CRASH INJURY ECONOMICS: THE COSTS OF TRAINING AND MAINTAINING AN ARMY AVIATOR

Armand E. Zilioli Apr. 1971 26 p refs

(DA Proj. 3A0-62110-A-819)

(AD-725482; USAARL-71-17) Avail: NTIS CSCL 05/9

While the hardware costs of Army aviation accidents are known, the monetary costs of injuries and fatalities have not been determined. In order to ascertain these costs, the training and maintenance costs of aviators are needed. The report presents a study of training and maintenance cost of Army aviators in all grade levels from training up to, including, and after an accidental death.

Author (GRA)

N72-13087# Air Force Human Resources Lab., Brooks AFB, Tex.

SINGLE CONCEPT FILMS IN THE TRAINING OF FLIGHT SKILLS

Milton E. Wood Nov. 1970 44 p refs

(AF Proj. 1710)

(AD-728685; AFHRL-TR-70-34; Task-171003) Avail: NTIS CSCL 05/9

A study was conducted to determine the effectiveness of single-concept films in the training of T-37 landing maneuvers. Films study significantly reduced the amount of air time required to reach or exceed the levels of proficiency demonstrated by baseline students in normal landing practice. The study also provided insights into the production of in-flight films and their subsequent use as cartridge-loaded, single-concept film materials.

Author (GRA)

N72-13088# Biomarine Industries, Inc., Devon, Pa.

A STUDY OF DIVER PERFORMANCE WITH COMMUNICATION AIDS, PHASE 2 Final Report, 30 Sep. 1970 - 30 Jun. 1971

Brendan P. Thompson and Irving R. Streimer 30 Jun. 1971 58 p refs

(Contract N00014-70-C-0162; NR Proj. 197-008)

(AD-726225; UWCP-70-15) Avail: NTIS CSCL 05/9

The performance of two divers working at 33 ft. on a communication dependent task was observed and measured. Comparisons between productivity and error generation using closed and open cycle breathing apparatus, as well as helium/oxygen, nitrogen/oxygen and argon/oxygen mixtures, were made. Measurement of oxygen uptake and carbon dioxide production during the communication task, as well as for a series of constant swim rates, was recorded. No significant difference in productivity was noted for any gas mixture or breathing apparatus used. Significant differences were noted in error generation for the helium/oxygen mixture. In addition, the distribution of errors between specific letter-number pairs and sound groups differed significantly for helium/oxygen mixtures. Oxygen uptake during the communication task was equivalent to that previously measured for self-paced work.

Author (GRA)

N72-13089# System Development Corp., Santa Monica, Calif. **PROBLEM SOLVING AND LEARNING BY MAN-MACHINE TEAMS Final Technical Summary Report, Dec. 1964 - Nov. 1970**

Aiko M. Hormann, Sharon Kaufman-Diamond (Calif. Univ., Los Angeles), and Carlos Martin Cinto (Calif. Univ., Los Angeles) Jul. 1971 262 p refs

(Contracts N00014-70-C-0221; DAHC15-67-C-0149)

(AD-729070; SDC-TM-4771/000/00) Avail: NTIS CSCL 06/4

The report describes research work in artificial intelligence, human and machine-aided problem solving and planning activities, interactive languages and visual input/output techniques, and man-machine synergy.

Author (GRA)

N72-13090# Illinois Univ., Urbana. Aviation Research Lab.

ANNOTATED BIBLIOGRAPHY ON RESPONSE SURFACE METHODOLOGY AND RELATED PAPERS Interim Report

Charles W. Simon Apr. 1971 13 p refs Prepared by Hughes Aircraft Co., Culver City, Calif. Aerospace Group

(Contract F44620-70-C-0105; AF Proj. 9778)

(AD-729192; AFOSR-71-1941TR;

HAC-Ref-71-27-3945/C1183; Task-61102F) Avail: NTIS CSCL 12/1

The annotated bibliography provides basic references to multivariate analysis by use of response surface methodology. The references cited are being used in the preparation of documents on the application of Response Surface Methodology to human factors engineering research.

Author (GRA)

N72-13091# Air Force Human Resources Lab., Brooks AFB, Tex.

ASSESSMENT OF TWO METHODS OF SEQUENCING GROUND TRAINER PRACTICE FOR UNDERGRADUATE PILOT TRAINING

Gary B. Reid, William V. Hagin, and David H. Coats Dec. 1970
17 p refs
(AF Proj. 1123)

(AD-728687; AFHRL-TR-70-40; Task-112302) Avail: NTIS
CSCL 05/9

The study was an operational evaluation of two methods of instruction sequencing for the T-38 phase of Undergraduate Pilot Training. Scheduling of concentrated trainer phases prior to aircraft flight improved student performance for early aircraft rides as compared with an intermixed trainer and aircraft schedule. Although grade differences washed out prior to graduation, the students who trained under the block schedule completed training in 38 fewer aircraft flights than the students who trained under the intermixed schedule. Author (GRA)

N72-13092# TRW Systems Group, Redondo Beach, Calif.

DIVER INSTRUMENTATION Final Report

1 Aug. 1971 18 p refs
(Contract N00014-70-C-0310; NR Proj. 101-821)

(AD-728065; TRW-16416.002) Avail: NTIS CSCL 06/11

The diver instrumentation program was initiated for the purpose of conducting a study leading to the development of small, lightweight instruments to be used to monitor physiological parameters of divers. Tasks were defined as follows: Design, fabricate and test sensors to monitor respiratory heat loss; Design, fabricate and test a multipurpose diver instrument pack containing power supply, tape recorder, signal conditioners and pressure sensor; Package for evaluation a sensor for measuring the partial pressure of oxygen in a diver's breathing apparatus.

GRA

N72-13093# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

HUMAN INFORMATION PROCESSING AND REACTION TIME

Richard W. Pew 10 Mar. 1971 14 p refs

(Contract F44620-69-C-0115; AF Proj. 9778)

(AD-728217; BBN-2111; AFOSR-71-2193TR) Avail: NTIS
CSCL 05/10

The report was prepared to summarize for an engineering-oriented audience some of the basic principles underlying the determination of the time for human information processing.

Author (GRA)

N72-13094# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

VISUAL RECONNAISSANCE FROM THE NOSE VERSUS SIDE SCANNER STATIONS OF AN AIRCRAFT Final Report

James L. Porterfield, Steve A. Heckart, Herschel C. Self, E. P. Hanavan, and Don F. McKechnie May 1971 20 p refs
(AF Proj. 7184)

(AD-729226; AMRL-TR-71-21; Task-718404) Avail: NTIS
CSCL 05/5

The study investigated airborne visual reconnaissance from the nose versus side scanner stations of an aircraft. Six subjects performed the search task at the nose station of a B-50 aircraft and six different subjects performed the task at the two side scanner stations, located aft of the wings. During each pass one subject at the nose station and one at each of the scanner stations searched for tactical target sites located in rolling farm and woodland, and identified and counted the individual targets at the sites that they located. A mean of 65 percent of the target sites was detected by the subjects in the two scanner stations, whereas only 36 percent were detected by the subjects

in the nose station. On the other hand, for the target sites that were detected, the scanner subjects identified only 37 percent of the individual targets while the subjects in the nose identified 60 percent. Wide differences between subjects were found in their search and identification performance. Author (GRA)

N72-13095# Army Test and Evaluation Command, Aberdeen Proving Ground, Md.

HUMAN FACTORS Final Report

1 Jul. 1971 63 p

(AMCR Proj. 310-6)

(AD-728824; MTP-6-3-525) Avail: NTIS CSCL 05/5

The procedure provides general guidance and extensive checklists of human factors considerations in evaluating electronic equipment. Author (GRA)

N72-13952# Royal Swedish Academy of Engineering Sciences, Stockholm.

NEW KNOWLEDGE OF LIFE PROCESSES

In its Develop. in Res. and Technol. during 1970 1970
p 84-92 refs In SWEDISH

Avail: NTIS; Almqvist & Wiksell, Stockholm: 25 Kr

Based upon recent developments in enzyme synthesis, the latest knowledge on genes, and particularly their isolation, synthesis, and functions, are discussed. ESRO

N72-13960# Royal Swedish Academy of Engineering Sciences, Stockholm.

ENVIRONMENTAL PROBLEMS

c05

In its Develop. in Res. and Technol. during 1970 1970
p 193-203 refs In SWEDISH

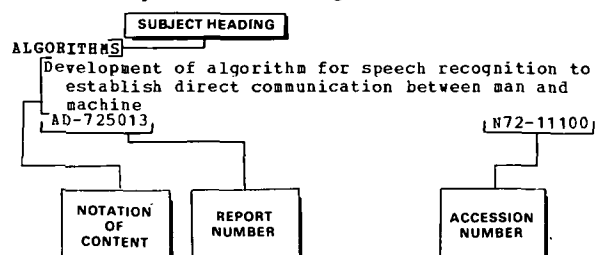
Avail: NTIS; Almqvist & Wiksell, Stockholm: 25 Kr

Swedish environmental problems are critically analyzed, in particular the use of DDT, chlorinated biphenyls, heavy metals, and plastics. Reference is made to several methods of control and legislation. ESRO

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AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Suppl.100) MARCH 1972

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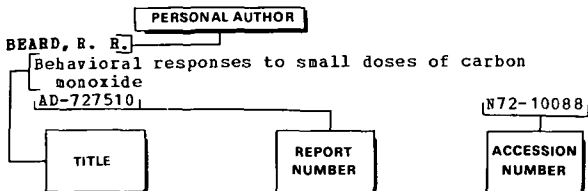
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Space biology and medicine, volume 5, no. 4, 1971
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Medical primatology 1970; Proceedings of the Second
Conference on Experimental Medicine and Surgery in
Primates, New York, N.Y., September 7-12, 1969.
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Ballistocardiography and clinical studies;
Ballistocardiograph Research Society, Annual
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Proceedings. A72-13141
- Measurements of cranial blood flow using
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Coronary heart disease; Proceedings of the International Symposium, Frankfurt am Main, West Germany, January 22-24, 1970. A72-13176
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Bibliography: Codes, standards, procedures, specifications and reports relating to contamination control [NASA-TN-X-63982] N72-13059

- LEDUC, P.
Energetical continuity between present-day and
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A72-14768
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A72-13624
- LIASKOVSKII, M. S.
Experimental and psychological examination of airmen
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A72-13723
- LICHTLEN, P.
Coronary heart disease; Proceedings of the
International Symposium, Frankfurt am Main, West
Germany, January 22-24, 1970.
A72-13176
History and clinical findings related to selective
coronary angiography.
A72-13177
Appraisal of the xenon clearance method for
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A72-13181
- LIEBESKIND, J. C.
Analgesia from electrical stimulation in the
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A72-15361
- LINFORD, A. G.
The formation of a competitive motor response by
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A72-14706
- LIPMANN, F.
Gramicidin S and tyrocidine biosynthesis - A
primitive process of sequential addition of amino
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A72-14790
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Visual guidance of locomotion.
A72-13879
- LOTZ, R. G. A.
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Method for processing muscle biopotentials for input
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- LUZAK, H.
Assessment of arrhythmia of heart rate during
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A72-14899
- LUTZ, J.
Spinal mesenteric vascular reflexes - A contribution
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A72-15125
- LYMAN, J. T.
Radiological physics characteristics of the
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A72-13693
- LYTKIN, M. I.
Changes in the coagulating and anticoagulating blood
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A72-15233
- M
- MACCABEE, H. D.
Radiological physics characteristics of the
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A72-13693
- MACCHI, A.
Plasma volume and corpuscle mass determined with
serum albumin with I-131 and with red corpuscles
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[NASA-TT-F-14070]
N72-12021
- MACDOUGALL, J. D.
Muscular exercise, 2,3-DPG and oxy-hemoglobin
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A72-14898
- MACEWEN, J. D.
Effects of inhalation of Freon 113 on laboratory
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[NASA-TM-X-67461]
N72-13050
Toxic Hazards Research Unit
[NASA-CR-124835]
N72-13060
- MAILYAN, E. S.
Effect of hypodynamia on gas exchange in animals
N72-11990
- MAKAROV, G. P.
External respiration, gas metabolism, and energy
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under conditions of weightlessness
[JPRS-54493]
N72-12057
- MANONTOVA, T. V.
Oxidoreductases and the stability of coacervate
drops.
A72-14784
- MANGELSDORF, D.
Prototype cold weather face mask
[AD-727744]
N72-12063
- MANSUROV, T.
Mechanisms of hemodynamic changes during muscle
activity
A72-15232
- MARGULIS, L.
Microbial evolution on the early earth.
A72-14800
- MARKOV, V. S.
Use of automatic volume control in systems for
registering physiological functions
N72-12007
- MARSH, J. T.
Receptor and neural responses in auditory masking of
low frequency tones.
A72-15251
- MART'IANOV, V. A.
Nature of motor neuron reflex response in human arm
muscles
A72-15587
- MARTINOV, P. D.
Prevention of fainting in flying personnel
A72-13722
- MARTIN, W. B.
Pattern recognition of EEG to determine level of
alertness
[AD-726210]
N72-12035
- MARTON, T.
Handbook of human engineering design data for
reduced gravity conditions
[NASA-CR-1726]
N72-12048
- MASLENNIKOVA, L. S.
Parameters of the oxygen metabolism in the skeletal
muscles of adrenalectomized rats after physical
strain
A72-13991
- MATLOPP, J. M.
Effects of ischemia and reoxygenation on regional
myocardial performance of the dog.
A72-15719
- MATTER, C.
Sensitization by annular surrounds - Sensitization
and masking.
A72-13936
- MATTHEWS, C. W.
The origin of proteins: Heteropolypeptides from
hydrogen cyanide and water.
A72-14772
- MATVEYEV, A. D.
Relationship between the thresholds of cupular
endolymphatic system response and man's tolerance
to motion sickness
N72-11996
- MAYER, D. J.
Analgesia from electrical stimulation in the
brainstem of the rat.
A72-15361
- MAYER, G. P.
Parathyroid hormone - Secretion and metabolism in
vivo.
A72-15228
- MAYNARD, J. A.
The effects of exercise training and denervation on
the morphology of intrafusal muscle fibers.
A72-14895
- MAZZONE, R. W.
Diffusing capacity and anatomic dead space for

- carbon-18 monoxide. A72-15215
- MCFARLAND, R. A.
Human factors in relation to the development of
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- MCGHEE, R. B.
Improved techniques for the control of remote
devices [AD-728214] N72-13085
- MCKECHNIE, D. F.
Visual reconnaissance from the nose versus side
scanner stations of an aircraft [AD-729226] N72-13094
- MCLANE, R. C.
Development of techniques for measuring pilot
workload [NASA-CR-1888] N72-12060
- MCLEES, B. D.
Analysis of the physiologic effects of microwave
radiation [AD-728397] N72-13069
- MEAD, J.
Control of ventilation during speech. A72-15218
Comparative sensitivity of four methods for
measuring changes in respiratory flow resistance
in man. A72-15222
- MEDNIKOV, B. M.
The origin of ribosomes and the evolution of rRNA. A72-14793
- MEISTER, D.
Human factors: Theory and practice. A72-13023
- MEL'NIKOVA, A. E.
Problem of biological dosimetry in the acute
irradiation of men A72-14606
- MENDEZ, D. P.
Simulation of rendezvous of a man in deep space N72-13084
- MENGEL, C. E.
Effect of circadian rhythm on CNS oxygen toxicity. A72-14867
- MESSETER, K.
The effect of acute and chronic hypercapnia upon
the lactate, pyruvate, alpha-ketoglutarate,
glutamate and phosphocreatine contents of the rat
brain. A72-13677
- MESSINA, C.
Blink reflexes during sleep and wakefulness in man. A72-15250
- MESTER, E.
Biological effects of laser radiation. A72-14610
- MILLER, R. A.
Handbook of human engineering design data for
reduced gravity conditions [NASA-CR-1726] N72-12048
- MILNOR, W. R.
Pulmonary vascular response to exercise in the dog. A72-15464
- MILSUM, J. H.
Control system aspects of muscular co-ordination. A72-14705
- MITCHELL, B. A., JR.
A cardiovascular system model for lower-body
negative pressure response [NASA-CR-115243] N72-12015
- MITCHELL, J. W.
Peripheral modifications to the central drive for
sweating. A72-15212
Development of mathematical models of environmental
physiology [NASA-CR-115268] N72-13057
- MITRO, S.
The universal perception meter A72-13884
- MITZ, M. A.
The properties of an ion selective enzymatic
asymmetric synthetic membrane. A72-14787
- MOCCETTI, T.
Appraisal of the xenon clearance method for
recording myocardial blood flow Determinations
under different hemodynamic conditions.
- MOISEEVA, L. N.
A model of selective accumulation of carbohydrates
diffusing through artificial polymer membranes. A72-14788
- MOISEEVA, N. I.
The role of certain deep cerebral formations on
sleep process control in man A72-15585
- MOLNAR, P.
On the dynamics of various rhythms in the
electrocorticogram of a cat asleep and awake
[NASA-TT-P-14068] N72-12022
- MOOR-JANKOWSKI, J.
Medical primatology 1970; Proceedings of the Second
Conference on Experimental Medicine and Surgery in
Primates, New York, N.Y., September 7-12, 1969. A72-13068
- MOREAU, H.
Reflections on the medicopsychological surveillance
of aircrew in fighter pilot school - The time in
pilot training A72-14569
- MOZZHUKHIN, A. S.
Changes in the coagulating and anticoagulating blood
systems during parachute jumps A72-15233
- MUKHIN, L. M.
Extraterrestrial-life study - Problem of its origin
and evolution. A72-14806
- MURRAY, D. M.
Applications of aerospace technology in biomedicine.
A technology transfer profile: Patient monitoring
[NASA-CR-124817] N72-13056
Applications of aerospace technology in industry. A
technology transfer profile: Food technology
[NASA-CR-124815] N72-13071
- MURRAY, T. M.
Parathyroid hormone - Secretion and metabolism in
vivo. A72-15228
- MUSACCHIA, X. J.
Myocardial correlates of helium-cold induction and
maintenance of hypothermia. A72-15720
- N
- NADEL, E. R.
Peripheral modifications to the central drive for
sweating. A72-15212
Development of mathematical models of environmental
physiology [NASA-CR-115268] N72-13057
- NEUBAUER, J.
Measurement of coronary blood flow in various
hemodynamic conditions using the argon technique. A72-13183
- NEWSON, B. D.
Gyroscopic stimulation of the semicircular canals
during sensory deprivation. A72-14865
- NIKITIN, M. D.
Providing radiation flight safety for the Soyuz-9
spaceship crew N72-11995
- WILSEN, R.
Numerical analysis of pressure and flow pulsations
in a segment of the arterial tree. A72-12951
- NINOMIYA, I.
Hypothalamic stimulation and baroreceptor reflex
interaction on renal nerve activity. A72-15722
- NORMAN, D. G.
Handbook of human engineering design data for
reduced gravity conditions [NASA-CR-1726] N72-12048
- NOVIKOVA, S. P.
Method for determining serotonin
(5-hydroxytryptamine) in the intact blood of rats
N72-12005
- O
- O'NEAL, J. D.
Influence of oxygen and carbon monoxide

- concentrations on blood carboxyhemoglobin saturation. A72-14863
- OBRIEN, V. W. Providing radiation flight safety for the Soyuz-9 spaceship crew N72-11995
- OBRIEN, T. W. On the dynamics of various rhythms in the electrocorticogram of a cat asleep and awake [NASA-TT-P-14068] N72-12022
- OPARIL, S. Mechanism of pulmonary conversion of angiotensin I to angiotensin II in the dog. A72-15465
- OPARIN, A. I. Problem of the origin of life - Present state and prospects. A72-14752
- ORAN, S. Clinical significance of the coronary arteriogram. A72-13847
- ORDIN, P. M. Mishaps with oxygen in NASA operations [NASA-TN-X-67953] N72-12056
- ORNE, M. T. Research on management and control of response to stressful situations [AD-727078] N72-12030
- OSEPCHUK, J. M. Comparison of potential device interference and biological exposure hazards in microwave leakage fields. A72-14032
- OSTROVSKII, D. N. A possible pathway of biological membrane evolution. A72-14786
- OSWALT, R. Two safer aircraft instruments. A72-13698
- OTROTCHENKO, V. A. Extraterrestrial-life study - Problem of its origin and evolution. A72-14806
- P**
- PANOV, V. G. Fast and slow fibers in human muscles A72-13989
- PANTSCHAVA, E. Some information on the possibility of preglycolytic ways in evolution. A72-14799
- PARNLEY, W. W. Effects of ischemia and reoxygenation on regional myocardial performance of the dog. A72-15719
- PASINETTI, A. Some aspects of the interaction of primary cosmic rays with tissues. A72-12911
- PEGHAM, G. V. Alteration of sleep and circadian rhythms by the use of drugs. A72-13071
- PEIPER, U. Spinal mesenteric vascular reflexes - A contribution to the problem of the nutritional hepatic reflex of H. Rein A72-15125
- PESTOV, I. D. Experimental basis of several methods of preventing unfavorable effects of weightlessness [NASA-TT-P-14027] N72-12050
- PETROV, R. V. Study of streptococcal flora of the human pharynx in isolated human subjects N72-11994
- PETROV, V. M. Providing radiation flight safety for the Soyuz-9 spaceship crew N72-11995
- PEVZNER, E. A. Gravitation receptor: Evolution of the structural, cytochemical, and functional organization A72-13850
- PEW, R. W. Human information processing and reaction time [AD-728217] N72-13093
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- PHILLIPS, W. D. Sensitization by annular surrounds - Sensitization and masking. A72-13936
- PIEDRAFITA, D. F. P. Some effects of ionizing radiations on the digestive system [NRC-TT-1498] N72-12019
- PIECHUKOV, Y. Y. The role of water in the genesis of biological organization [PR-57] N72-12018
- PLATONOV, N. B. A device for constraining the eye movement angle during nystagmograph calibration A72-13724
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- POLLARD, E. C. Action of ionizing radiation on sensitive strains of escherichia coli B [NYO-2804-39] N72-12028
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- POLLARD, M. Antibody response of normal and germ free rats to injected sheep erythrocytes when held in a helium-oxygen atmosphere. A72-14861
- POLYAKOV, B. I. Relationship between the thresholds of cupular endolymphatic system response and man's tolerance to motion sickness N72-11996
- PONNAMPERUMA, C. Chemical evolution and the origin of life; Proceedings of the Third International Conference, Pont-a-Mousson, France, April 19-25, 1970. Volume 1 - Molecular evolution. A72-14751
- POPKOV, V. L. Effect of hypodynamia on gas exchange in animals N72-11990
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- POWELL, D. Parathyroid hormone - Secretion and metabolism in vivo. A72-15228
- PRETER, B. History and clinical findings related to selective coronary angiography. A72-13177
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Etiological factors associated with the diminution of ballistocardiographic amplitudes occurring with advancing age. A72-13144
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Lateral geniculate unit activity and eye movements - Saccade-locked changes in dark and in light. A72-13623
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R

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Introduction to system safety engineering. A72-14573
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Influence of oxygen and carbon monoxide concentrations on blood carboxyhemoglobin saturation. A72-14863
- RODRIGUEZ, J.
Muscular exercise, 2,3-DPG and oxy-hemoglobin affinity. A72-14898
- ROLFE, J. H.
A matter of interpretation.

- ROMAN, J.
Digital automatic data reduction techniques used in a 1000-flight biomedical study [NASA-TN-D-6601] N72-12059
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Familial cardiomyopathy - A review of 11 families. A72-14443
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Neurophysiological effects of different anesthetics in conscious man. A72-15220
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Splanchnic vasoconstriction in hyperthermic man - Role of falling blood pressure. A72-15217
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Changes in the activity of aspartate aminotransferase and mitochondrial membranes in response to accelerations N72-11992
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Handbook of human engineering design data for reduced gravity conditions [NASA-CR-1726] N72-12048

S

- SALMONSEN, P. C.
Safety of INH chemoprophylaxis in aviation personnel. A72-14872
- SALTIN, B.
Peripheral modifications to the central drive for sweating. A72-15212
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- SANTAMARIA, L. J.
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Study of times of tolerance to hypoxia among pupil pilots in the course of their aeromedical instruction in a decompression chamber A72-14567
- SAPRIW, A. W.
Glycolysis in adenovirus infected rat cell cultures and in adenovirus type 12 induced hamster sarcoma cells [NASA-TT-F-14061] N72-13062
- SARGEANT, A. J.
Body temperature in exercise - Effects of acclimatization to heat and habituation to work. A72-14896
- SARVIHARJU, P. J.
Effect of endurance training on the urinary excretion of noradrenaline and adrenaline during ground and flying activity. A72-14868
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Radiation exposure on high-altitude passenger flights. A72-13234
- SCHINDLER, A.
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- SCHRIER, A. H.
Primates in eye movement research. A72-13073
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Effects of alcohol ingestion on tracking performance during angular acceleration. A72-14474
- SCHULER, A. R.
Application of adaptive mathematical models to a T-37 pilot performance measurement problem [AD-72632] N72-12062

- SCHWABE, G. H.
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A72-14916
- SCHWARTZ, P. L.
Exercise-induced changes in serum enzyme activities
and their relationship to maximum oxygen uptake.
A72-14897
- SELF, H. C.
Visual reconnaissance from the nose versus side
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[AD-729226] N72-13094
- SEMELENKO, E. I.
Odorimetric evaluation of polymers used in
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- SEREBROVSKAYA, K. B.
Possible role of structural lipids in accumulating
the energy of light.
A72-14779
- SEBEDENKO, M. M.
Mechanisms of hemodynamic changes during muscle
activity
A72-15232
- SERIKOV, I. S.
The role of reinforcement in the formation and
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A72-15581
- SEYDANETOV, M. A.
Effect of hypodynamia on gas exchange in animals
N72-11990
- SHADRINTSEV, I. S.
Method for processing muscle biopotentials for input
into an electronic computer
N72-12006
- SHAHIDI, N. T.
Muscular exercise, 2,3-DPG and oxy-hemoglobin
affinity.
A72-14898
- SHASHKOV, V. S.
Method for determining serotonin
(5-hydroxytryptamine) in the intact blood of rats
N72-12005
- SHELBURNE, S. A., JR.
Visual evoked responses to word and nonsense
syllable stimuli.
A72-15248
- SHEPARD, R. J.
Effects of physical conditioning upon the central
and peripheral circulatory responses to arm work.
A72-14900
- SHERP, L.
Familial cardiomyopathy - A review of 11 families.
A72-14443
- SHEVYUN, O. N.
Odorimetric evaluation of polymers used in
constructing isolation chambers
N72-12003
- SHILOV, V. M.
Study of streptococcal flora of the human pharynx in
isolated human subjects
N72-11994
- SHITZER, A.
Further studies on the dimensionless parameters
associated with the 'in vivo' transport of heat
within biological tissue.
A72-14864
- SHUB, C.
Safety of INH chemoprophylaxis in aviation
personnel.
A72-14872
- SIDEL'NIKOV, I. A.
A device for constraining the eye movement angle
during nystagmograph calibration
A72-13724
- SIESJO, B. K.
The effect of acute and chronic hypercapnia upon
the lactate, pyruvate, alpha-ketoglutarate,
glutamate and phosphocreatine contents of the rat
brain.
A72-13677
- SIMKO, G. J.
Dry-heat resistance of *Bacillus subtilis* var. *niger*
spores on mated surfaces.
A72-15261
- SIMMONS, R.
Effects of physical conditioning upon the central
and peripheral circulatory responses to arm work.
A72-14900
- SIMON, C. W.
Annotated bibliography on response surface
methodology and related papers.
[AD-729192] N72-13090
- SINDERHANN, P.
A neuroelectric signal recognition system.
A72-15253
- SMITH, A. H.
Effect of altered 'weight' upon animal tolerance to
restraint.
A72-14866
- SMITH, A. B.
Radiological physics characteristics of the
extracted heavy ion beams of the bevatron.
A72-13693
- SMITH, B. E., JR.
A radiographic method for demonstrating
decompression sickness in hamsters
[AD-728396] N72-13067
- SMITH, J. C.
Receptor and neural responses in auditory masking of
low frequency tones.
A72-15251
- SOKOLKOV, V. I.
External respiration, gas metabolism, and energy
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